

## SEQUENCE LISTING

<110> Brana, Alfredo F  
 Biotica Technology Ltd  
 Leadlay, Peter F  
 Martin, Christine J  
 Méndez, Carmen  
 Moss, Steven  
 Olano, Carlos  
 Oliynyk, Marko  
 Salas, Jose A.  
 Sanchez, Cesar  
 Wilkinson, Barrie  
 University of Oviedo

<120> BORRELIDIN PRODUCING POLYKETIDE SYNTHASE AND ITS USES

<130> GRF/FPBP6194559

<150> GB0230217.2

<151> 2002-12-27

<160> 113

<210> 1

<211> 74787

<212> DNA

<213> Streptomyces parvulus Tü4055

<400> 1

```

gatccccgcgc ggcacgcgcg tcgacgtgct gggggccggc gaccgctggc cccacagcgc      60
ggcaccgcgc caccggggac tcctcaacgc ctggtggggc gcctgggtct gggccacggc      120
cttcgaccgc tacgcgtcga ggacctacga cgacgccag gacgtcgacg cgatccacga      180
cgcgggcgga ctggtcatgg ccggtgccgg attcgacatc ctgcgcccg tgctcgcat      240
cctcttcgtg cgccgggtga ccgcgcaca gcacgcgaag gccctgcgg ggcccacccc      300
gccgacgcac tgagccgccc gcaccogtga tcccgccccg cgatccccgg gcccgataaa      360
tgcgttggcc ccggcgcgcg cctgtggtgg gatgagcggc gacgggggcg gctccccggc      420
gtgcatcctt ctaccttcc tgcaaagatc ccgcgcgcc actctccgc cccgttcttc      480
cgtcccgagc cgtgcgccgc gtggaggctt tcctgttgct cgccgccgag tccgtactgc      540
tgcgccgtga ccagagcgtc tacgtgacct cggggtccga gccggacggc ccgccgagg      600
ccgcactgcg ccggctcgag gccgaactgc tcggccggcg ccacgccgtc tccgcgccgc      660
tgcacgcggc cctgcctcc ttggactccg aggaactggc ggccgcccac gtacgcctcg      720
tcggactcgt cgacgacctg ctgggtccg accgcacca cccccgctc ttccgccgct      780
tccgcgcac cgtgcgcgc gacaccgagg cgctgtacgt ggaccgogtc ttgccttcc      840
tgctgcagca gcccgagcag cctgcgtgc tgtgcggcga ggcgcgcacc gtctgcccg      900
tgtcaccctg cggcacctg gtctgccggc tgtgctggga cggctccgac tacgcgggat      960

```

gcccgtgtg	ccaccgcagg	atcgacgggg	acgacccctt	cctgcgtccg	gtccgtgccg	1020
tcggcgccgc	cagggcgacc	gtaccggggc	cgctgcgact	gctgcgcctg	ggcaccgaca	1080
tgaccgccga	cgccaccacg	gcgggtggacg	ccctgctggc	ccgccgcacc	ccgctctccc	1140
cgcaggaccg	ggacgacctg	ctcaccctgt	tgccgctcac	accggccggc	cggggcgacc	1200
tgccgcagga	catcccggtc	cgcgagacca	aggcgctggt	cctgggcgcg	ctggtgcgcc	1260
gggcaccgtc	gcggccgggc	ctgcggaggc	tgctcgccga	gcggctcacc	accgccaccg	1320
acgtgctgcg	gctgctcgcc	gtgctctcgg	gcggcgacgc	cgggctggtg	acaccggcac	1380
ggttcacgaa	cgttccccgt	tccctgcggc	gtgacctgct	cgccgtcctc	gacggactgc	1440
cggcgccgta	cctggctcag	gacatgctgc	ggcaccacc	ggcgtggaag	cggggccgcg	1500
agggtgctga	ccccttcgag	gggcacaccc	ggcaccgcg	cgccgcgctc	gccaccgccg	1560
tgctgcgcgc	cacaccgttg	gaccgggaca	ccgccttcgg	cgccgccctg	ctgaccacgg	1620
ccgcgcgcga	cccggaacgc	gtgcgcccgg	acggcacccc	agtccgcccg	gccacctggg	1680
cgggacggct	ggagcaggcg	atggccgagg	gggacgccgc	tcggggccg	gccctcgccg	1740
gggagcggcc	cggcgaactg	gtgcgccgcc	tggacgtggt	gctgcgcctg	cacaccgacg	1800
aggcgctcgt	gccggagctg	gagaaggccc	tgccggcacgg	gctgccgaag	gtgggcccgg	1860
gcccgctgct	gtcggcgctc	ggggcgctgc	ggacacgcac	cgaggaccgc	accgggaccc	1920
ggcgcggtgt	cttcccgcgg	ggcgacgtca	cccgggccct	gtccgtcccc	gagcggcgcc	1980
ccgccttgcc	cgccggggccg	gtgtccgagg	tggtcgccct	gctggagggg	gaactgctgc	2040
gccggttcgc	cgccggggcg	ccctacgagc	tgctgggtgct	ggacgccgga	ctgaccgacc	2100
tcaccgtgcc	gttcaccgag	cggaccgccg	ccaaggccct	ggtgaccgtg	ggccgcggca	2160
gcgtccaggc	actccccgag	ggctccgtgc	tcgactggtt	cctgcactgg	acggaacccc	2220
ggggcaaccg	caccgacctg	gacctgtccg	tcgccttctt	cgacgccgag	tggacgttca	2280
ccggcctgtg	cgactacacg	aacctggtgc	acggtcggga	cgccggcgatc	cactccggcg	2340
acctcacgtc	ggccccggcg	ccgcgcggcg	ccaccgagta	cgtggacctc	gacctggagc	2400
ggctggcgcg	gcgggggagac	acctacgccg	tcccgctggt	gttcagctac	aacaacgtcc	2460
cgttcgagga	actgccggac	gccttcgccg	ggttcattgg	gctgcccgcg	gaaggcccgc	2520
gcgacgcgac	ctacgaccgc	cgcaccgtgc	ggcagcgctt	cgacctcgcg	ggcgactcca	2580
agggtgtgct	gccgatgac	gtggacctgg	cccgcggcg	ggcgttggtg	accgacaccc	2640
acctgccgtc	cgcgggcggc	ttccagagca	tcggttcgca	cggcgggcgt	gagctggccg	2700
cgggtggccg	tgacctctgg	cagcagttca	cctcgggcgg	ccgggcgacc	ctgtgggacc	2760
tcgccgtcct	gcggggcgcc	gccctctcgc	cggaggtggc	ggtggtgtcc	cgggagccgg	2820
agcccgcggt	gctgcgttac	cggcggcggg	cggccgagag	cgaggccgcg	ttcgccgtcc	2880

gagtcgcgtc ccacaaggac gccgaggaac ggctggcgca caccgacccc gactcggccc	2940
cgcccggggt cgccgccggc cggcggtct tctcgcgac ggtccacggt gacgtccggc	3000
cgccgggggc gtcgggcaag tctaccggc tcttccccgg gcccggggac gcctcaccga	3060
cctgacccg cgtgaccgcc ggggacctgc tcgccgagct gggctgagcc aggcgcgggc	3120
ccgcgccggc ccgcgccggc ccgtccctgc ccgtgccga gggctcgccg gtcactccgg	3180
ccaggcggag ttctcgatga cctcgacgaa gtccgtacgc cggaagccgg gcgcgaagtg	3240
ctccagcaca tccgcgttca ccgtgccgaa ggtggtcgcg gcccggtgct cgaacccctc	3300
ggtgaacgcc cgcaggatct gcttcttgaa gtccggggcg ggatgcgcgg cggtagccgc	3360
gtcgatctgg gcccggtga gattgccag ccgcaggccg agcacgtcg tctccacgcc	3420
ggcggtggtc gccgcgatct cgggggccat ccggtacggc acctccggag tgggtgtcag	3480
ggcgacggcc gtccacacgg tgtccgcgtc ggctcgggg atgccgtggg cgagcaggaa	3540
ggcgtggggc tggtcggcac cgtccatctc gaagcgctgg tcgtcaccgc ggtagggcg	3600
caccaggccg gtgtcgtgga agagcgggc gatgtacagc agctccgggt cggggcggt	3660
gcccgaggcg gcggcctgga ggctgccgaa gaggtacaca cggcgtgagt ggtggaagat	3720
cagcggcgga gtggtgtcgc ggatcaggtc ggtcgccctc ccgcgccggc cgctgtcggg	3780
aatctcgatg ccggcgatct gctcggccat ggctgccctc cggggaatcg gtgccgtcgt	3840
tgctgcctcc acctccgcc cggcgcgacc ccggcgctcc ctacccgatg gccgacaacc	3900
ccttacaagc ggccatgtgc cccgcgccgc cgcctcagcc gccgtccggg cgcgggccgg	3960
cgtccggcac ggtggtggcg aagcgctgcc ggtagcgggt gggcgacagc cccagatgac	4020
gggcgaaggc ccggcgagg ctctcgtagc tggggaaacc cgacagcgcg gcggcctcgg	4080
tggcgttgtg cccggagtcg agcagcgct tggcgatgtc gaaacggatc agctccacgt	4140
acttcacggg cgtgacgtcc agctcggccc ggaacatccg ggtcagatgc cgggggctga	4200
cccgcacgcg cgccgccaac gcggccagac tgtggtcggc ggccggatcg gcctgtacgg	4260
cgtcctggac ctgccgcagc acgggcgtcc gcggcgccgg gcccgcgaac gaggcggaga	4320
actgcgactg gccgcgggcc cgtgcaggt acaccaccag cgagcgcgcg acctgcggg	4380
cgagatcggg ccggtggtcc tctccagca gcgcgaggc caggtcgatg cccgcgctca	4440
cgccggcgga cgtgtaggtc gcccgtcct tgacgaagat cgcgtcgggc tccacgcgtg	4500
tcgacggaca gcggcgggcc agcgcggtg tgtgctgcca gtgcgtcgtc gcccgctctgc	4560
cctccagcag acccgggca cccagcacga aggcgccgg gcacaccgag gcgacgcgtc	4620
cggcccgggc cgccagcgcc ttcgcggcgt cgatgagccg tgggtcgacg ggcgagccgg	4680
gcagcgcgtc accgcgcagc acgacgagc tgtccggcg gccggcgga cgcgcgtccg	4740
cctcggccgg gaccagcagg ccgatggacg aacgcaccg cggcccgctc ggggagacga	4800

cgccgagccg gtaccggggc ccgaaccggt tggcctccgc gaagacctcc gccggccccg 4860  
 acaggtcgag catcttcatg ccgtcgaaga ccaggatgcc cacgctgtgc gctctcgccg 4920  
 tcatgtctcc ctctccggg gccggcgggc ccctgcgcgc cattgtcccg ccggccgtcc 4980  
 acgccggcgg ccggcgggcg gggcgggccg cggtcggaat gaggcgcgcc ggacatcggc 5040  
 gtaggggtgg gagcgtgtgt tcggccgcgg tcccggagac cgcggaacgc aggacctttg 5100  
 gcaggcacgc ggaaggacag cgatgggtac ggtcaccacc tccgacggca cgagcatctt 5160  
 ctacaaggac tggggccccg gcgacgccc gccgatcgtc ttccaccacg gctggccgct 5220  
 caccgcggac gactgggaca accagatgct gttcttcttc tcgcacggct accgtgtgat 5280  
 cgcccacgac cggcgcgggc acggccgctc gggccagccc tcgacggggc acgagatgga 5340  
 cacctacgcc gccgacgtcg cggcgctgac cgaagcgctc gacctgcggg acgcggtcca 5400  
 catcgggcat tcgaccggcg gcggcgaggt cgcgcgctat gtggcgcgcg ccgaaccggg 5460  
 ccgggtcgcc aaggccgtgc tggtcggcgc cgtgcgcgcg gtgatggcca agtccgacgc 5520  
 caacccccgc ggcaccccg tccgaggtct cgacgggttc cgcacggccc tggccgcca 5580  
 ccggggcccag ttctacatcg acgtgccctc cggccccttc taaggattca accgggaggg 5640  
 cgccaaggtc tcccagggcc tgatcgacaa ctggtggcgg cagggcattgt cgggcgcggc 5700  
 caacgcccac tacgagtcca tcaaggcggt ctccgagacc gacttcaccg aggacctcaa 5760  
 ggccatcgac gtgccggtgc tggtcgcgca cggcaccgac gaccaggctg tgcctacgc 5820  
 ggactcggcg ccgctgtcgg tgaagctcct gaagaacggc accctcaagt cgtacgaagg 5880  
 gctccgcac ggcattgctt caccaccacc cgagggtggtc aaccccgacc tcctggactt 5940  
 cgtgaggtcc tagtcggcgc tcacgcggc gacacgggag cgggtgcggc gccgcgcacc 6000  
 ggggtgcttg tcaggacgga gacccggttg aaggcggtga tgctgatcg caccagatc 6060  
 acggcgagga cctcgtcgtc cgacaggacg ccccggtgct gcgcgtaggc ggcgctctgc 6120  
 gcggcgggcgt ccgcgggacg ggtggtcgcc tccgcgaggg cgagcgccgc ccgctcccga 6180  
 gcggtgaaca gctcgggtgt ccgccaggcg ggcagcaccg ccaggcgctg ggtcgtctcg 6240  
 ccggccccga gcgcgcctt ggtgtgcaga ctgagacagt aggcacaggc attgagttgg 6300  
 gagacgcgga tgttcaccag ttccacgagg aggcggtcca ggccggccgc cgcggcgggc 6360  
 tccgcacccg attccgcgc gccacgaac gctttgtacg cgcgggggt ctgcttgctg 6420  
 acgaagacc gccgctcgtc cgtcgccacc ggggctgct gtgtcacgtg gtctccttcg 6480  
 tcgcgtcttc ttccggcggg tcctatcatc acccccatgg atgttgaaag tgaaactttc 6540  
 aggtcggggc cggacgggg cgcggtgtga gcaacacgga gacacggccc gcggagatgc 6600  
 ggtgcggcgc cctcgaagac gaggtgccc cgcggggcgt cgaagtctc accgcccgtg 6660  
 acgtccccct cggcgggccc cgcgccatga ccgtgcggcg cacgtgccc cagcggggcc 6720

ggacgctgat cggagcctgg tgcttcgccg accactacgg tcccgcacgac gtggccgcgt	6780
cgggcgggcat ggacgtcgcc ccgcacccgc acatcggcct gcagacggtc agctggctgt	6840
tcagcgggga gatcgagcac cgggacagcc tcggcaccca cgccttcgtc aggcccggcg	6900
aactcaacct gatgaccggc ggcttcggca tcgcccactc cgaggtctcg acccccgaca	6960
ccactgtcct gcacggcgtc cagctctggg tggcgctgcc ggaggagcac cgcgacaccg	7020
gccgcgactt ccagcaccac gcacccgcgc cggtcgcctt cgacggcggc acggcacgcg	7080
tcttcctcgg ctgcctcgcc ggggacacct cgcccgtagg caccttcacg ccgctgctgg	7140
gcgcccagtt gacgtggtg ccgggcggca ccgccacct ggacgtcgac cccggcttcg	7200
agcacggcgt cctcgctcgac agcggtagc tacgcgtcga gggcgccgtc gtgcgaccgg	7260
ccgaactggg ctacgtcgcg ccgggtcgcg cgacgtcgac cctgaccaac gagtcggccg	7320
caccgcgccg gctcatcctc ctcggcggcc ccccgttccc cgaggagatc atcatgtggt	7380
ggaacttcat cggccgggtcg cacgacgaga tcgtgcgggc ccgcgaggac tggatgaagg	7440
gcgaccgctt cggcgagggtg cacggctacg acggggcacc cctgcccgcg ccggaactgc	7500
cgaacgcacc cttgaagccg cgacgaaggg cgcgctgac tgccggggaca tgggttgga	7560
ccaagggttt cggcgctgct cgatcaccga acccaccgcg agtcactctc gggtgagtcc	7620
cgaacggtcg ccgggagcgc gtgagcacgt gcgcagatgc tcggcgatga tgccgagaat	7680
cgcaccccg tgctccagca ggtagaagt accacccgcg aagggtgcga gtgtgaacgg	7740
gccgtccgtg tgttcggacc atgccgggc ctgcaccggg gtgaccatcg ggtcatcatc	7800
cccgtcaag gcatggatgg ggcaccgcag ctccggggcc ggtcggtagc ggtaggtctc	7860
ggcggccctg tagtcgccgc ggatggcggg gagggccata cgcaccagct cctcgtcgtg	7920
gaagacctgc tccgcggtgc cgtcgagggt cctcagctcg gccaccaact cctcgtccga	7980
caggaggtgc accgtacccc ccgtcctctg ccgggacggg gcgggcctgg ccgagacgag	8040
gagtgcctcc agggagatgc ccgcactctc gaaccgtcgg gccagttcga aggcgagggt	8100
ggcggccatg ctgtgtccga acagcgcgac cggctggtga acacggggcc gcagcacggg	8160
gaagagctgg ttgcgagtt cgtcgatgtc ctccaggggc ttctccgcgc gccggtcctg	8220
ccggccgggg tactggaccg cgagcacgtc gcaccggggt gccagcgcg cagccacggg	8280
gtggtagaac gtcgcgagc cgcggcggtg cggcagacag atcaactggg gtgccgtggg	8340
atgtgcgggg cggtagtgc tgatccacac gtcgctgtgg gtgttcgtac cggatcatcag	8400
cgggtgctgc ctccggcggt ggcgttggtg cgggggatgg ccgatccggc cgtgacgct	8460
ccgtcgaccc cgagggtctg cccggtgacg taggcggcga gggggctgag cagccagacg	8520
accgcgttgg ccacctcctc gcaattgccc agggcgccca gcggagcccg gcgcgcccgt	8580
tgtgcgaggg cgctgggatc ggcgtacagg ctgcgcagca tgggggtgtc ggtcgaaccg	8640

gggctgacca cgttgacgcg gatgccgtcg cccgcgtact gcagggccac cgacttgctc 8700  
 aggccgatga ccgcgtgctt ggtggccgag tagagcgggc tctgggcgtg gccgatgtgc 8760  
 ccggccactg atgcgcagtt caccgatcgcg ccgccgccgg ccgtcagcat ggcctcgatc 8820  
 tgtccgcgca tgcacgacca gacccacgc aggttggtgg cgatcacgcg gtcgaagttg 8880  
 tcggcgggtg cctggtgcag cggaccgaac gagccgaagg tcccggcgtt gttgaacgcc 8940  
 ccgtccagcc gtccgaaccg gctcaccgcc cgggccacgc agtccgccac ctgcttgctg 9000  
 tcaccgacgt cgcagggcac caccaagtgg tgcgaggagg gtagtccggc ggttgctctc 9060  
 gtgagggccg actcggtgcg gccaccagg acgacgcgtg ctccgtgccc cagcaggagc 9120  
 cgggccgcgg ccggccgat gccgtgccc gctccggtga ccatcatcac gcggtcggtg 9180  
 agttccagac tcatcgttgt tccaacgctc cgtccctgct cgtcggatgt gcgatccgct 9240  
 gtgtcatatg tgcagtccgc cgttgacgtc gacgaccgtg ccggtggtgt atccggcgtc 9300  
 ctgccgcac agatggcaga ccatgcccgc ggcctcggcg acgtgccga agcggccggc 9360  
 ggggatgtgg ctgacgcggt cggcggcca ctgccccggc ttgtcctccc aagccggcg 9420  
 gatgcgctcg gtgccgatga cgcggtgggc gaccgcgttg accgtcacgc cgtgcggggc 9480  
 cagttcgtag gcgcaactgt tgggaaccc gatgacgccg gccttgggcg cgacgtaggc 9540  
 ggcattgctg aaccgggtgt acgtgcgacc ggccacggac gccagggtga cgaccctgcc 9600  
 ccaccccgcc gcgaccatcg ccgggacgca cagccgggtc atggtgaaca cgctcgccag 9660  
 gttgtgcgtg acggcctcct ggaggtcggc ctcggtcagt tcggtcaccg agcgggcccg 9720  
 ggtgtcgcca ccgacgccgt tgaccaggac gcccggccgg tgetgcgggg cgagcgagtc 9780  
 gacggcggac gccaggcggt gagggtcggt caccgtcggc accagcgggt cccgggccag 9840  
 ccggtcgccg agcccgctcg cgaccgggtg caccgcctcg gcgtccttgt cgagcaggac 9900  
 caccgcagg ccccgggccg ccaggcctcg ggcgacctc gcgcagatgc cgctgcccgc 9960  
 tccggtcacc agagccacgt cgtgtcgtgc cgtcatgtgt tcctccgcca gccgccgccg 10020  
 gattcccagg tggccgcgca ccgggtgtgt cgcagtagtt ctccggtcgg ttcgatgccc 10080  
 gtgcccggac cggtaagggt ttcgaccggc tgcagtgacc ggtcgacggt gaacgccggc 10140  
 gtggtcagtg gcacggggaa cactcgtcg gcccgggccg cctcgaccgt ctgccacagg 10200  
 tcccatgcgg tggccagggt gcgcccggcc gccacagcg gcccacctc ggccacgtga 10260  
 acgccgagct ggcaaccgac gccgagctcg tcggcgcgca gtgccaggcg tgccgcggcg 10320  
 aggaaccgc cgcacttcga cagccgtacg ttgatgtggc tggcgggccg gctggtggcg 10380  
 gcggcggtga ggtcggccgg tccggtacag gactcgtcga gcatgacggg cagaccggtg 10440  
 gcccgccgca gccggcccaa ctccggccag gaccgcggcg ggagcggctc ctccacccac 10500  
 cccacgcgct ccagttcgcc cgcgacctc tccgcttct cggccgtcca ggcgcggtg 10560

acgtccagtg agacacgggt gtccggcggg aggcggtcct gggccgccgt cagccgggtcc 10620  
accgccccgg cggggtccgc caccttgatc ttcacgtgcc gcaacgccgc cagcgccccg 10680  
ggcgtgagtg cgtccaggac ggtcgcgacg tcgcgcgaga ggtggatcac gaggtgacg 10740  
gacgtcggtc cgtcccgcgc tgatcgggca ggcgggggcca ggaccgcag gacgtcggcg 10800  
agcgggccgg cgaaatgccg gcacaccgcg tcgagcaggg cgatctccac ggcggccgcc 10860  
gccgacgagc cgtcagcag ccgggtcagc ggcagctgtg cgatcgaggc gacggcgctc 10920  
tcgaagtccc gccactcgat gcgctcggcc agtccccgg gatcgaggc ctggacgggt 10980  
cgcaccgcgc cgtccagggt ctcaccgggt acgtagtgcg ggggcgctcc ctctcccat 11040  
ccgcgggtgc ccgccagctc gatctcgacc agcagggacg ccgcgctgcg acgggagcgc 11100  
gtggcggtgt cgaaggccgc ggccatgggc acgacggcgg tgtgcagccg tacgcgacgg 11160  
atcacgcttc ctcttcagc cgcgtggcca gccagtcca gtacgccgtc cgggccgacg 11220  
tgaactccac gtagtgccga tccgtggcga agacctctc gtgcagggt gacgtcagac 11280  
gccgcagcat cgctcgcgc gccgacaggt cgatgatcgg gtcgtgagtg gggagcgcca 11340  
ggtcgacggg gagccgggtg cggggggcac cgcgggcata gtggtcctcc aggtgcacga 11400  
gcgtgcctg cgtggccgag gtgacctgc gcagcatcag gtgatccccg gtgaggaaact 11460  
cccggtagcg cggcaggctc gtgtagtcgc cgtcggcgag cccacgggc cgtagccgc 11520  
tgccggtgag cgcgcggcgc tcggcgagcg tgtccgcgg gtggcgcgcc cgctgctgtc 11580  
ccagcgcggg cgcgcacagg accaacctgc ggacgggcag atcgcggtg caccagagcg 11640  
cggccagcac gctgccgcc aggtctctgcc ccaggcgac cggcccgga ccgccgacct 11700  
cggccgtcac ggcgtcagag gcgcgggcgt agtcgtcag gacgagatcg gccgacggca 11760  
ggtggccgcg agggccctcg ctgcggcccg agcctctgcg gtccaggcg tagacgtcga 11820  
tgccgcgtgc gttgagctcg ggccccgtct cgaacagcca gccgcgtgg ctctggatgc 11880  
cgtggaggta gaagacggcc gaggtggcg cgggcgtggt ccagtgggtc agggtagacc 11940  
cggtgccgtc ggcagcggtc agcatgctcg tggtgggcat gggctgcctc ctcagtaccg 12000  
gacgagattg acgtcggggt ccagccggac gtcgacgag agcggtcctt cgagcgtcga 12060  
caacaggctc ccgacggcgt cgagttcttc cgccttgcg acggtgagg cactgcgc 12120  
catcgccgtg gccagcccg cgaggctcgg ccaggcgaac gccgagtac cggggtcgta 12180  
gccgtggttc ctgagtttgt agtgctcggc tccgtacgcc ccgtcgttga gtacgaccac 12240  
gacgagcggc agccggtacc gtaccgccgt cgtgaactcc gacaggtgca tcatgaagcc 12300  
gccgtcccc acggcggcga ccacgggccc gccggtccc gccgtcgcc cgccgatcgc 12360  
cccggcgac ccgagccga tcgagccgaa gccgccatg acggtgaagt gcagcgggtc 12420  
cgccacgcgc agatacggcc agacaccac gtcgaagcgg ccgatatcgc tgacgacact 12480

gcgctcggcg ggcagtatcc ggtccagccg gatcatggcc gtccggatgt cgacgggtctc 12540  
 cgctccactg cggctcgtcga cgtcgtcctg cggcgagaac ccggccagtt gcccgggcagc 12600  
 gcgctccgcc caggcgccgt tggccgcggt gactccggcc tgatccagca ggacgttcat 12660  
 ggtctcggcc gtgcgggcggg catccccggc cacgggctcg tcgacggggc tgtacgagcc 12720  
 gaaccgtgcc ggatcgggtgt ccaogtgac gactctcttg ccgcgagca gctcgccgtt 12780  
 gagcacggtc cacatgttca ggctcgcccc gaacgcgac acgcagtccg actcggcgat 12840  
 gaccgtgctc gccacgctgt gcgcgagcga gccgaagatg ccgacgtcgc gggggtgacc 12900  
 ggcgaacatc tccttgccga gcacgggtgt ggccagcgct gctccggtac ggtccgccag 12960  
 ctccaccagg gcctctcgcg caccggcgac ggccgcaccg tgcccggcga ggaccagcgg 13020  
 ccgcttgccc gagccgatca gccccagcgc gccgtccagc gcctcggcct ccggagcggc 13080  
 cagaggaccc ggcgccaccg ggagcgtgac cggcgccctgc tcgcccgcct ccgcctgcat 13140  
 gaggtcgatc ggcacattga gtacgacggg ccgccgctcg gccacgatcc gctggacggc 13200  
 ccggttcagg tccgcgacga gcgaggccgg tctgtggacg cgttcgtacc ccgcgcccgc 13260  
 cgcggccgcg accgtcgcga tgtcgaagt gtggaagtgc gtgggcaccg gtggcggatc 13320  
 acctgtgate agcaggacct ggctgtggct acgagccgct tccacaagag gggtaaggc 13380  
 gttggtgaaa gccggcccgt gcgtcacgga cgcacaccg atgccgccgc acatacgtgc 13440  
 gcggccgtcg gccatggcga cggcgcccgc ctcggtggcg accgccacga accgtccgcc 13500  
 cgcgtcggcg aaggcgggca gatagagcag attggcggtt gccatgagac cgaagacggt 13560  
 atcgacgccg tgtgcggtca gagcgtcggc gagcgcgtgg aaaaccttca ttgctgtccc 13620  
 tcggtcgggg cgggctggag ccagacggga tcgttctggt cgaccggcgc gcaggtgggt 13680  
 ggcgggtcct cgcggagcag ggaacgcagg tggttgccg tgatgagcac ggtgggtccg 13740  
 gcgcagtccc gggcgacggc catccgccgg gcgagaactt gggggtgccg caccgcgcgg 13800  
 gtcaggctgt gcagcggggc cgcgggcacg ccgacggctg ccgcgcgctc cagtacggcg 13860  
 gcgacggggc cctcggcccc cgggtggcgg ccttcgcgt cgacgaggac cgtgccgtcc 13920  
 gccgcccga cgaggtggg ggcccgtgc ggtggggcgg tgaaccagcg gtcctgggtg 13980  
 agccagacag cgctgtcga cagcgcgacg tcggcgggcg atccgtgctc ggtgcgcaga 14040  
 cggacgtagg tggacacgac ggcggcggca gcggccaggt aggcaccgag gacgtcggcg 14100  
 ctggacactg gagtctcag cccggcgccc gggccgccga cgaggcgcat gatgcccagc 14160  
 tcggcctgga tcacggtgtc gacgtcgcg tcggcgggcg ccaggccatg gccggtgacc 14220  
 gtgcagtga cgacgccgtg ccgggacagg atctgatcgg gggcgaggcc ctgcgcggtg 14280  
 agtgtgtcgg ccgcgaggtt ggtgagcac atgtgcac cggcgagcag ccgctcgaac 14340  
 ccggcccggc cctcggcgct gcgaggtcg agccgacagg agcgtttgcc cgcgttggtg 14400



acgtagtaga ggtagccgac cccggccacc tgctgggcga gccgccggga cccttcgccg 14460  
 tgccggcggt ccaccttcag tacgtcgccg ccgagttggg ccagcagccg gcccgcggtgc 14520  
 ggtccggccg tgtacgagcc gacctccagc aggcggacgc cgcgcagcgg aggagtgccg 14580  
 cgcgcgatcg gctcccagag gccgccctgc cggggcatcg gaccgtcggg gacggcggtt 14640  
 atgagggaac gcagtgggct gcccggtgta ccggacgggt cggtgaccag gccgcgacgc 14700  
 cggggcgccg ctccgtcgcg tacctcctcg ggggccgcga cctgggcgca cgggatgccg 14760  
 gcggcccgcg gggcggtcac cacgtccacg gcccgctgcc cggcggtcca cttgccgagg 14820  
 atctcgtcga gctcgtcgcc gttgcggacg cgggcggcgg tgcggcgaa gcgaggggtcg 14880  
 tcggggagggt cccgtcgtcc caggactgcg gtcagcctgt gccatatcgg ctgcgccatc 14940  
 gtgcagatga cgacaggggc gtcctggcac gtgtagctgt tccaggggtgc cgccatgccg 15000  
 tgcgggttgc cggtagcagc tggcgacga ccggcgagcg cgacgctcgg aagcaagggtg 15060  
 cccgtcagag tgaacaggct gtcgaactcg gcgatgtcca ggtagtccc gcctcctccg 15120  
 cgctcgcggc cgatgagccc ggccacgacg gcgatcagac cggacagggc cgccgtacgc 15180  
 gacgccaggc ccaccacgga gaggaccgat ggttccccct cggtgccggt cgccgaggtc 15240  
 agggccgcca gcgcctgcaa ggtccgctcg gtggccgggg cgtcacgcag cgggccggtg 15300  
 agcccgaacg cgctcagccg caccgcgacc aactcggggc tgcgatgcgg aagttccggc 15360  
 gccccgagcc ccagagcggc gagccgctca tcgccctccg cgtcgcacac cagcacatcg 15420  
 gccgtctgca gcagacgcga tgccctggcc caaccggacg ccgactgcgc ggcggagtgc 15480  
 agccaccgct cgaacgggcc cccgtgatcg ggtgatcgcc agagcgtcac gacacgtgcc 15540  
 ccgaggtccg cgagcagtct cccagcaggt gcggctggtg tactgcggcc ggccatgagt 15600  
 acggcgatgc cctcgagcgg ccctgcctt gtcattggaat tctccctcgc tccgcgcacc 15660  
 gatgcggggc tcggctcgtca ccgctgattg gtcgtggacg tcggccgtga ggcgaccgcc 15720  
 agggaaatca caccggcgcc gcccgcatcc gcgggggatc tggccggcag tcccgatgcg 15780  
 ccattaaagc gcgcatgatt cgttcctgtc cgaccgtagc accgagacgg cggaaaatca 15840  
 tcgcacaccc ctgctccgga tccggaaaac ctgctcaggg ggcaaggggg agggggtccg 15900  
 taatggccaa aacgaaattt tacggagctt tacgtttgct ggacgatcta ttggtgagcg 15960  
 cctcgacggg ctggacatgg cagtagtgaa tgtccgcatt catggctatt agtaccgtga 16020  
 ccctgatcac acgagccctg gttgacgggt gaaatttggg gctggcagag tgatgacgag 16080  
 cttccgtccg caaagtgggt gaataactgt tccgaaatct tcggcaattc aaaggagact 16140  
 tacgggggat gcctctatta atgtattgct gtaggcgaa ataatgacag gcagtgtgt 16200  
 ttcggcccca ttctgcagc ctcccgaacc cgtctcaggg cactccgaac ggaaaagcga 16260  
 tcccgctctt ctgctcgccg ccggacgccg tgcccgcatg gcggatgccg tacgtgccgc 16320

cggcgctcag gcgggcatcg acccggccgt cctacggcgc acccgggcca ccttgatcac 16380  
 cgcggggagc gcgggagccg caggccggct cgccgccgcc ctgcgcctga ccggcgccac 16440  
 gatctctctg gacaccgcg agacaccac actgctcgcc ctgcacctcg ccgccaagc 16500  
 gctgcgggcg ggcgacacct cttacgcgt cgtcggtgcc gaacttcccg acgggaactg 16560  
 cgcgttgatc ctggccaggc agtcagcggc aaccgccgag ggggctgtgc cccaggcgat 16620  
 cgtccgcacc accacggcgg accgcaccac cacggcggat cacgcccctg cgcccgacga 16680  
 ccacggcagc ccggcccgtg aagccccgca tgccaccgc acgttgtccc caggcatcac 16740  
 ccaggccccc gccgagggct tcccgggcct gctggcgacc ctgcacgacg acacaccct 16800  
 gcgccccacc gcggtcaccg agcacggcag cgacgccacc accgtcctcg tcctcctcga 16860  
 ccagccccag gacgccgcac ccgcggcacc gctcccctgg gtggtctcgg cccccacac 16920  
 ccgcgccctc cggggcacgg ccgcgacct ggccgtccac ctgcacacca caccggccgc 16980  
 acccgccgac gtcgcgcaca ccctgctcac cgcgcgcccc gaccgccacc gtgccgcgt 17040  
 cgtcggcgcg gaccgggcca ccctcaccga cggactgcgc gactcgcga ccggaggcga 17100  
 cgcgccccac ctcgccacg gcaccgccac cggatcgccg cgtcccgtct tcgtcttccc 17160  
 cggccagggg tcgcagtggc ccggtatggc cgccgaactc ctcgaaacca gcgagccctt 17220  
 tcacgacagc gtgcacgctt gcgccgacgc gctggccgag ttcgtcgact ggtcggttct 17280  
 cgacgtcctg cgccaggcac cggacgcgcc acccctgcgc cgggtggacg ttctccagcc 17340  
 caccctgtgg gcgacgatgg tctccctggc cgaggtctgg cgctcgtag gcgtggaacc 17400  
 ggccgcgctc gtcggccact gctacggcga gatcgccgcc gcgcaggtag ccggcgccct 17460  
 cgacatgcgt gacgccgcc gactgctcgc ccaccgcagc cgggcctggc tgcgactggt 17520  
 gggcaagggc acggtcatct ccgtcgccac ctcgggacag gacatcccc ggcgcatggc 17580  
 ggccctggccc gactccgtcg aactggccgc gctcaacggc ccgcgctccg tggcgctcgc 17640  
 agggccgccc gacgtcctgg acggcatcgt caacgacctg accgaccagg gcatccacgc 17700  
 caaacgcac cccggcgtag acaccgtcgg ccaactgctc caggtcgagg tcctccgcga 17760  
 ccacctgctg gacgtcctgc gcccggtctc gcccggccc gccgcgctgc cgttctactc 17820  
 caccgtcgac ggaaccgaac gcgacaccac cacgctggac accgactact ggtacctcaa 17880  
 caccgcagc caggctccgt tccaccaggc cgtgcggaac ctgctcgccg ccggacaccg 17940  
 ctcgttcgtc gaggtgagcc cgcacccgct gctcggagcc tccatcgagg acaccgcggc 18000  
 cgagttcggc ctgcacgacg tggccgcccgt cggcaccctg cgtcgaggcc agggcggcac 18060  
 ccgcccgggtc ctgacctcgg tggcgaggcc gtatgtccac ggcacgcaca tcgacttcac 18120  
 gccgccttc accggcacga cccccaaccg catcgacctt ccgaccgtcg aggaccacgg 18180  
 catcgagggt cacggcgacg acggcggcga gacatggacc gaccgcgtca gaaccctccc 18240

ggacgagcag cgcgaagagg ctttgctgga cctcgtgtgc cgcaccgtcg ccgcggtgct 18300  
 cgaagcggac ccggccggca cggcggacgc cgtcgcccc gacacggcgt tcaaggagat 18360  
 gggcctcggc tcaactgagcg cggtcgggt ggcgaacggc ctccgcgagg ccaccggcgc 18420  
 ccacctgccg gccaccatcg cctacgacca cccacccccg gccgctctgg ccgcccacct 18480  
 ggcgatgacc ctgttcgacg cgacggggcg cgccccggcg gtcccggcac cgagccgcga 18540  
 cgacgaaccg atcgacgccg agaccgctgt gctgaccgcg ctggaacggg ccgacgaggc 18600  
 gctggaacgg ttgcggggccc cgcacgccc caccgccccg caggagaccg gccggcggat 18660  
 cgacgagctg ctgcggtccc tgaccgacaa ggccaggcgg atgagacagg ccgacgccgt 18720  
 cgatgatgtc gatgatccgg ccaccgaccg gttcgcccga gccaccgacg acgagatggt 18780  
 cgaactcctc gagaaacgtt tcggcatctc ctgaggcgcg ccgacctccc gactgcgag 18840  
 tcgcttcccc cactatcccc gaaggcggca accgatggca catgaagaca aactgcgcca 18900  
 cctcctcaag cgtgtcagtg ctgaactcga cgacaccag cgccgggtgc gtgagatgga 18960  
 ggagagcgag cgcgagccga tcgcgatcgt ggggatgagc tgccgtctgc ccggcgggggt 19020  
 gaacagcccc ggggagttct ggtcgtgct gaggccggg acggacgccg tctcggagtt 19080  
 cccgcgggac cgtggctggg atgtggagaa cctctacgac ccggaccgg acgccccgg 19140  
 gcggctgtac gtccgcgagg gcggattcct ggacggggcc ggacagttcg acgccgcctt 19200  
 cttcggaatc tcgccccgtg aggcgctggc gatggatccg cagcagcggc tgctgctgga 19260  
 gtgctcgtgg gaggcgatcg agcggtcgcg gatcgaccg aagaccctgc acggcagccg 19320  
 gaccggcgtc ttgcggggct ccaactggca ggactacaac accctgttgc tgaacgccga 19380  
 ggagcgctcc cagagctacc tggccaccg cgctccgga agcgtgctgt ccgggcgcgt 19440  
 ctggtacacg ctgggcatgg aagggcccg gatcacctg aacacggcgt gctcgtcctc 19500  
 tctggtcgcc gtccacctgg cggccggtc cctgcggggc ggggagtgcg acctcgccct 19560  
 ggcggcgcc gtcacgggtc tgtccacacc gcagcttcg gtgccttct ccgggcagcg 19620  
 cggactcgcc cctgacggtc gtcgaaagc cttcgcggtt tcggccgacg gcatgggctt 19680  
 cggcgagggg gtgggcgtgc ttgtgctgga gcggtgtcg gtggcgcggc ggaacgggtc 19740  
 tcgggtgttg gcggtggtgc ggggttcggc ggtgaaccag gacggtgcgt cgaacggctc 19800  
 gacggcgccg aacggtcctg cgcagcagcg ggtgatacgt gcggcggttg cgagtgccgg 19860  
 gctgggtccg gccgatgtgg atgtggtgga ggcgcacggc acggggacgc ggttggtgga 19920  
 tccgatcgag gcgcaggcgt tgctggcgac gtacgggcgg ggccgggacg cggagcgctc 19980  
 gttgtggctg gggtcggtga agtcgaacat cggatcatcg caggctgctg ccggtgtcgc 20040  
 cgggtgtcatc aagatggtgc tggccatgga gaaggccgt ctcctcgga cgctgcatgt 20100  
 ggatgagccg tcgggtgagg tggactggga ctcggtgctg gtgcggctgc tgaccgaggc 20160

gcgggactgg ccgctcggagg aaggtcgtct gcggcgggcc ggtgtgtcgt cgttcgggat 20220  
ctcaggcacc aacgcgcacg tgatcatcga ggaagcaccg gaagaggggg aggaaccgga 20280  
gtccgacgcg ggtggtgtgg tgccgtgggt gctctccgcg cggacggaag gggcactgca 20340  
agcacaggcg gtgcaactga gcgagttcgt cggcgagtcg agtcgggtgg atgtgggttg 20400  
gtcgttggtt tcgacgcgtg cggcggtcga gcatcgggcc gtggtggtgg ggcgcgggcg 20460  
ggacgagttg gtgcggggct tgtccgaggt cgcgcagggt cggggcgtga ggggtgtcgc 20520  
gtcttcggcg tcgggtggtc tcgcgtttgt ttttgcgtgt cagggcagtc agcggttggg 20580  
gatggggcgg gggttgtatg agcggttccc ggtgtttgcc gaggcgttcg acgaggtgtg 20640  
tgggcgggtc ggtccggggg tgccggaggt tgttttcggt tcggatgcgg gtgagttgga 20700  
ccggacggtg tgggcgcagg cggggttggt cgcgttgag gtggcgtgt ttcggttgtt 20760  
ggagtcctgg ggtgtgcggc cgggttgtct gatcgggcat tcggtcgggtg agttgtcggc 20820  
ggcgtgtgtg gcggggttgt ggtcgttgga ggatgcgtgt cgggtcgtgg ctgcccgggc 20880  
gcggttgatg caggcgttcg cggcgggtgg ggtgatggtc ggggttcggg ccgagggcggg 20940  
ggagctggcc ggtttcctcg gtgaggacgt ggtgatcgcg tcggtgaacg cgcgggggca 21000  
ggtggtgatc gctggtcctg aggggggtgt ggagcgtgtg gtggctgctt gtggggcgcg 21060  
gtcgcgtcgt ctggcgtct cgcattgctt tcattcgcct ttggtggagc cgatgcttgg 21120  
ggagttccgt cgggttgtgg agtcggtggc gttcgggtgt cgcgtcgttc gggtggtttc 21180  
caatgtcacg ggtgcgtggg tggatccgga ggagtggggg acgcggagt actgggtgcg 21240  
tcagggtccgt gagccggtgc gtttcgcga cggggtcgcc acgttgctcg acgcgggtgt 21300  
gaggacgttc gtgcagctgg gtcccgccgg ggcgctcact tcgatggtca gccactgcgc 21360  
ggacgccacc gccacttcgg tgacggctgt acctaccttg cgcgccgatc acgatgagtc 21420  
gcggaccgtg ttgagtgccg cagcgtcctt gtacgtccag ggtcaccggg tcgactgggc 21480  
cccgtgttc ccgcggggcc gcacggtgga cctgcccacc tacccttcc agcaccagca 21540  
ctactggctc gacgtacctc ctctgttcac cgcctcctcg gcggcccagg acggtggctg 21600  
gcgataccgc atccactggc ggcggctcgg cagcagggac tccggggacc ggctctccgg 21660  
ccgctggttg ctgctggtgc ccgagtcgga cgggacggag ccctgggtgg agggggccga 21720  
gaagatgctg gccgagcgcg ggtgcgaagt cgtccacgtg ccgatcgcgg cgacggccga 21780  
ccgggacgcg atggtcggag ccgtgcgtga gagcgtcgag gacggtcggg tcgacgggtgt 21840  
gctcagcctg ctggcgtcgc acggccgccc gcacccgat gcggctgcgg tgccgacagg 21900  
gttggtcgcc acggcgcagg ttgtgcaggt cagtgcagag ctgggcatcg gcccgctgtg 21960  
ggtcgccacc cgacaggcgg tctccgtcga cggggccgat gaggtgacg gggccggtag 22020  
gaccaggaag gccgacgacc ccgccgatgt cgcgcaggcc gctgtgtggg ggctcggccg 22080

ggctgcgcgcg ctggagaagc ctcggttgtg gggcggcctc gtcgacctgc ccgcacgtgc 22140  
 cgacgaacgg atgcgggacc tgggtggctca ggccctcacc gctcccgcgc ccgaggacca 22200  
 acttgccgtg cgggcccgcg gcatcgccgt tcgccgactg gtacgctccg ccgcgtcggc 22260  
 cccggccgcg gactggcagc cgagcggcac cgtgctggtc accggcggca ccggaggcgt 22320  
 cggagccaac gtggcgcggt ggctggtcac ccaggacatc cagcacctgt tgctggtcag 22380  
 ccggcgcggc ccggacgccc ccggagccgc tgagctgctg gccgaactca gcgcctcagg 22440  
 aacgtccgtg accatcgagc cctgcgacgt caccgacgcg gacgcggtac ggcgcctgat 22500  
 cggcgccgta ccggccgaac ggccgctgag caccgctcgc caccgcgcgg gcgtactgga 22560  
 cgactgcttg atcgacgccc tgaccccgca gcgcctcgcc gccgcactgg aggtcaaggc 22620  
 caagggcgca ctgaacctcc acgaggcggc cggggaagcc cacttggtgc tcttctcctc 22680  
 gctggccgga acaaccgga ccaagggaca gggcaactac gccgcgcga acgcctatct 22740  
 cgacgctctg gccgaacggc ggcgtgctga cggcctgccc gccacttcgg tcgcctgggg 22800  
 cgcttgccag ggcgcgggca tgggtggcca cgcgcgcgta gccacacgca cgcgcggtta 22860  
 tggcctcccg ctcatgagcc ccgaccgcgc cgtcgccacc ctgcggcagg tcatggccga 22920  
 gccggtggcc acgcaggtgg tggcggacgt cgactggcag cgattcgctc ccgacttcac 22980  
 cgcggtgcgc ccagccgcc tcctcgccga cctgccgga gtgcgctccc tgggcgagca 23040  
 gcgaaaggac ggcccgggcg gtcaggcgca ggaggacggc ttggccagca agctggcagc 23100  
 cctgcccga gccgaccgcc gacgagccgt gctggacctc gtggaggaa tcgtcctcgg 23160  
 ggttctgggc cagcagacgc gcgcggcgat cggcccggac agttccttcc acgccatcgg 23220  
 cttcgactcg ctaccgccg tcgaactgcg caacctgctg accgtacgcc tcgggatgaa 23280  
 gctgcccgcg acctcgtct acgatcacc gccctgtcg tcgctggccg accacctgca 23340  
 cgagcaactg gttatcgac gcacccccat gacggacacc gcggccgacc tgetcgccga 23400  
 actcgacgca ctgcggcgca gactcgccgc cgtcgggctg gaaccggagg cgcgcgccc 23460  
 catcgacgc aggctcaagg acatgcagac cgctgcgaa ccaggtcgg agtcctcacg 23520  
 cgacctgaag tccgcctcac gcaccgaagt gctcgacttc ctaccaacg aactcggcat 23580  
 ctcccgtga ccagttgacc gaccgcgac aacggcgac ctggctgcgg ctgctccacg 23640  
 ccgaccttcg accttgcccg acgcccccg gagcggacta ccacatgcc caacgacgaa 23700  
 gaactcctcg actacctgaa gcggactgcc tcgaacctcc aggaggcgcg gcagcgggtg 23760  
 cacgaactgg aggagagcga gcgcgagccg atcgcgatcg tggggatgag ctgccgtctg 23820  
 cccggcgggg tgaacagccc ggaagagttc tggctcgtgc tggaggccgg gacggacgcc 23880  
 gtctcgaggt tcccgcggga ccgtggctgg gacgtggagc ggctgtacga cccggacccg 23940  
 gacgcccccg gcaagtcgta cgtgcgggaa ggcggattcc tcgacggcgc gggccgggtc 24000

gaccccgcggt tcttcgggtat ctccccgcgg gaggccgtgg tcatggatcc gcagcagcgg 24060  
ctgctgctgg agtgctcgtg ggaggcgatc gagcggtcgc ggatcgaccc gaagaccctg 24120  
cacggcagcc gcgcgggcggt gttcgtgggc tcgaacggcc aggactacgg gacgcttctc 24180  
ctgctgccc acgaccgctc ccacgcctac ctgcgccagg gcgcctccgc gagcgtgctc 24240  
tccggccgca tctcctacac gctcggactg gagggccctg cggtcacgat cagtacggcc 24300  
tgctcgtcct cactggctgc cctccacctg gcggcccgcg ccctgcgggc gggggagtgc 24360  
gagctggcgc tcgccggcgg tgtgacggtc atgccgacga cccgcctgtt cgaggtcttc 24420  
tcccggcagc gtggcctggc cggtgacggc cgctgcaagg ccttcgcggc cggggccgac 24480  
ggcactggct ggggcgaggg cgtgggcgta ctcgtcctgg agcggttgtc ggtggcgcgg 24540  
cggaacggtc atcgggtgtt ggcgggtgtg cggggttcgg cggtgaacca ggacgggtgcg 24600  
tcgaacggtc tgacggcgcc gaacgggtccg tcgcagcagc gggatgatccg cgcggccttg 24660  
gccagtgcac gcctggcccc cgaggacgtg gacgccgtag aggcacacgg cacggggacc 24720  
tccctgggcg acccgatcga ggcgcaggcg ttgctggcga cgtacgggcg gggccgggac 24780  
gcggagcgtc cgttgtggct ggggtcgggt aagtcgaaca tcggtcacgc gcaggccgct 24840  
gccggtgtcg ccggtgtcat caagatggtc aaggcgatgc aggcgggcac gctgccccgg 24900  
acgctgcatg tggatgagcc gtcgggtgag gtggactggg actcgggtgc ggtgcggctg 24960  
ctgaccgagg cgcgggactg gccgtcggag gaaggctcgc tcgggcgggc cgggtgtgtc 25020  
tcgttcggga tctccggcac caacgcgcac gtgattctcg aggagccgcc ggcggaggac 25080  
gcggtaccgg agcctgaagc gggatgatgt gtgccgtggg ttctttcggc gcggtcggct 25140  
gaggcgttgc gggagcaggc tgcccggctg gcgtcgggtg ctggtgggtt gaacgtggtg 25200  
gatgtgggct ggtcgttggc ttcgacgcgt gcggcgttcg agcacggggc cgtagtgggtg 25260  
gggcgggagc ggggaagagct gctcgcgggt ctgttcgctg tggctgcggg acgccgggt 25320  
gcgaacgtgg tgacggggcc cgtcagctcc ggtcggcccc cctttgtttt tgctggtcag 25380  
ggcagtcagc ggttggggat ggggcggggg ttgtatgagc ggttccccgt gtttgccgag 25440  
gcgttcgacg aggtgtgtgg gcgggtcggc ccgggggtgc gggagggtgt tttcggttcg 25500  
gatgcgggtg agttggaccg gacgggtgtg gcgcaggcgg ggttggttcgc gttggaggtg 25560  
gcgctgtttc ggttggttga gtcctggggg gtgcggccgg gttgtctgat cgggcattcg 25620  
gtcgggtgagt tgcggcggc gtgtgtggcg gggttgtggt cgttgaggga tgcgtgtcgg 25680  
gtcgtggctg cccgggcgcg gttgatgcag gcgttgccgg cgggtgggggt gatggtcgcg 25740  
gttcgggccc aggcggggga gctggccgggt ttccctcgggt aggacgtggt gatcgcgtcg 25800  
gtgaacgcgc cggggcaggt ggtgatcgct ggtcctgagg ggggtgtgga gcgtgtggtg 25860  
gctgcttgtg gggcgcggtc gcgtcgtctg gcgggtctgc atgcttttca ttcgcctttg 25920

gtggagccga tgcttgggga gttccgtcgg gttgtggagt cggtagcggtt cggtagcgcc 25980  
 tcgttgccggg tgggtttccaa tgtcacgggt gcgtgggtgg atccggagga gtgggggacg 26040  
 ccggagtact ggggtgcgtca ggtccgtgag ccggtgcgtt tcgccgacgg ggtcgccacg 26100  
 ttgctcgacg cgggtgtgag gacgttcgtc gagctgggtc ccgctgggac gctcacttcg 26160  
 atggtcagcc actgcgcgga cgccaccgcc acttcggtga cggctgtacc taccttgcgc 26220  
 cccgatcacg atgagtcgcg gaccgtgttg agtgccgcag cgtccttgta cgtccagggg 26280  
 caccgggtcg actgggcccc gctgttcccg cgggcccga cggtagacct gccacctac 26340  
 cccttcacga accagcaacta ctggatgatg aacaccggaa gtgccgccga gccggcggag 26400  
 ctggggctcg gcgatgcccg tcatccgctg ctcggttcgg tcgtcacctg cgcgggggac 26460  
 gacaaggctg tcttcgcggg gcggtggcg ctgcgcacac acccctggct ggccgaccac 26520  
 accgtgctcg acgcggtctt gctgcccgct acggccttc tcgaactggc cgtgcgcgcc 26580  
 ggtgaggagg tgagctgtcc ggtcgtacac gacctgacgc tgcaccgacc gctggtcgta 26640  
 cccgagcggg gcgcogtgca ggtacagatg gctgtgggcg caccggaagc cgatgggcga 26700  
 cgtgaggctc ggggtgtactc ccgccccgac gacgacgcgg agcacgagtg gacgctgcac 26760  
 gccgctggac tgctggcgtc ggccgccacg gcggagcccg ccgtggcggc cggtagcctg 26820  
 ccgccgccgg aggcgcaggc cgtggacctc gacggcttct acgccggact cgccgagcac 26880  
 ggctaccact acggcccgct gttccagggc gtccggggcg cgtggcggct gggcgacgac 26940  
 gttctcgccg agatcgtgct gcccgaggcg gccggcgccg acgccgcccg gtacggcatg 27000  
 catccggccc tgctcgacgc cgtcctgcac gcggcacggc tgggcgcctt ccgtgagcgg 27060  
 tcggaggaga agtacctgcc gttcgctgg gaaggcgtga ccctgcgtac caggggagcg 27120  
 accgccgtac gtgctcgaat ctcccgggcc ggtaccgacg ccatccggct ggacgtcacc 27180  
 gacaccgcgg accggccggt cctcacggcc gaatcgtca cgtgcgacc ggtctccgcc 27240  
 ggtcagctca tggccgtccc gcgcgactca ctgttcgggg tcgactgggt ttccgcgccc 27300  
 gccgcgaacg gtcccgccct gcggtggcc cgtgccgcca ccgtggaggc ggccctcgcg 27360  
 gcggacgccg acatcgtggg cgtgccatgc ctgcacagtg agggtagcga tcaggcgacg 27420  
 taccaggcac tggagctgct acagcgtgg ctggccgcgg acaccggtac caccacgctc 27480  
 gccctgctca cccaccgtgc cgtggcggtc ggcgacgacg tccacgacct ccaccacgcg 27540  
 cctctgtggg gcctgggtccg caccgcccag accgaacacc ccggtgctt ccggctcgtc 27600  
 gactcggacg accccgaccc gacgacggac gtccgtggcg cggcgctcgc caccggggaa 27660  
 cccaggtcg cgatccgtga cggcgccgtc ctggccccgc ggctgaccgc ggcctccgcg 27720  
 ccgcgggagc cggccgagtg ggacgcgcg ggaacagtcc tcatcaccgg cggatcgggc 27780  
 gccctcgag ggatcgtggc ccagcacctc gtgcacgtc acggcgtacg ccgactcgtc 27840

ctccgcgagcc gcagcggcag gcccgcaccg ggggcccacc tgctcgacgc cgacgtcacg 27900  
 gccgtgtcct gcgacgtctc cgaccgcgac gccgtggccg cgctgctcgc ctccgtgccg 27960  
 gacgaacacc cgctcaccgc cgtcgtgcac accgcaggcg tactggacga cggcgtcctg 28020  
 cagccctca cgaccgagcg catcgacacc tcgttcgcgg cgaaggctga cggcgcccgt 28080  
 catctccacg aactcacctc ccacctggat ctaccgcggt tcgtgctgtt ctctccgcg 28140  
 tcggccgtgc tgggcgcgcg cggacagggc aactacgccg cggccaacgc ctacctcgac 28200  
 gcgctcgccg cccaccgtcg cagcaacgac ctgccgcgcg tgtctctcgc gtgggggctg 28260  
 tgggcccagc acgagggcat ggcccgcgga ctccgtgacg ccgagctgac gcgtatttcc 28320  
 cggatcggcg tcaccgcgct gagcgcggag gacggcatgc ggctgttcga cggcggatgc 28380  
 gccggcgatc agtcacagct cgtgccgatg cgggtggaca ccgcggcgct gcgcgcacgg 28440  
 cgtgaccacc ttcccgcacc gatgtggagc ctgggtcccc agcggacccg agcggcacgt 28500  
 acaçagcctg ccgctcgtct tcgggacagg ctccgcgaac tgaccgcccc cgaacgcaag 28560  
 cgcacggtcc tcaactcggg gcgcaacgcg gtccgcgacc cactcggcca caacgccgcc 28620  
 gacggagtag cgcgcgacca gagcctcgac gccgcgggt tcgactcgct caccgcgctc 28680  
 gagttccgca accggctctc cgcggtcacc gacctgcgc tgcccgccac cctcacctac 28740  
 gatcacccca ccccgcggc catcgccgag cacatcctga cccgcctcac cctgctgaag 28800  
 gagaccgccg ccccgggcgt cggcaccgcc ccggttgccg cgcgcaccga agacgatgcg 28860  
 atcgtcatcg tgggcatggc gggccgcttc cctggcgccg tcgcgacacc cgaaggctct 28920  
 tgggacctcg tccactccg caccggacgc atctcggagt ggcccaccga ccgcggctgg 28980  
 gacgtggaga acctctacga cccggacccc gacgccgtcg gcaagtccta cgtacggcac 29040  
 ggcggattcc tgcacgacgt cgccggcttc gacgcgggct tcttcgggat ctccgcgct 29100  
 gaggcgtgg cgatggaccc gcagcagcgg ctctgctgg agtgctcgt cagggccctg 29160  
 gagcgggccc gcatcgaccc ggccacgctc agaggcagcc ggtcgggctg gtacgccgga 29220  
 gtgatgtacc acgagtacgc ctcccggtg ggcgccacgc ccgcaggctt cgaaggcaca 29280  
 ctccggcaccg gaagctcggg cagcatcgcc tccgggcgca tctcctacac attcgacctc 29340  
 accgggcccc cggtcacctg cgacaccgca tgttccacct cctcgtagg cctgcacctg 29400  
 gccgtgcagg ctctgcgggc cgggtgagtgc gaactggccc tcgccggcgg cgtcacctgc 29460  
 atgcacacgc cgcgccccct cgtcgagttc tcccgccagc gggcctggc cgcggacggc 29520  
 cggagcaagg ccttcgcggc ctccgcgcg ggggtggcct gggccgaagg cgcgggaatc 29580  
 ctctcctgg agcggctgtc ggcggcgccg cggaaaggct atcgggtgtt ggcgggtgtg 29640  
 cggggttcgg cggatgaacca ggacgggtgc tcgaacggct tgacggcgcc gaacggctccg 29700  
 tcgcagcagc gggatgatac tgcggccttg gcgagtgcgc ggctgggtcc ggccgatgtg 29760



gatgtcgtcg aggccacg caccggcacg gccctcggcg atccgatcga ggcgcaggcg 29820  
ttgctggcga cgtacgggcg ggggcgtgac gcggatcgtc cgttgtggct ggggtcgggtg 29880  
aagtcgaaca tcggtcacac gcaggcggcc gcgggtgtgg caagcgtgat caagatgggtg 29940  
caggcgatgc agggggcggt gctgccgcgg acgctgcatg tggacgagcc gtcgggtgag 30000  
gtggattggg actcgggtgc ggtgcggctg ctgaccgagg cgcgcgagtg gccgtcgggg 30060  
gaggggcgtg tgcggcgggc ggggtgtgtc tcgttcggga tctccgggac gaacgcgcac 30120  
gtgatecctg aggagccgcc ggcggaggac gcgctgccgg agcctgaagc gggatgatgtg 30180  
gtgccgtggg ttctttcggc gcggtcggca gaggcgttgc gggagcaggc tgcccggctg 30240  
gcgtcgggtg ctggtgggtt gaacgtggtg gatgtgggtt ggtcgttggc ttcgacgcgt 30300  
gcggcggttc agcaccgggc cgtcgtcgtg ggaggcgatc gggaagagct cctggggaag 30360  
ctttcctcgg ttccgggggt cgaggtcggg gtcggggctg gtgccgggtg tgggtgtggtg 30420  
ttggtgttcg ccggtcaggg gtgtcagtg gtcggtatgg ggcgggagtt gctgggttcc 30480  
tcgctggtgt tcgcggagtc gatgcgggag tgcgcggcgg ctctgtcgcc gtttgtggac 30540  
ttttctgtgg tggatgttct ggggtcggct ggggagttgg gtcgggtcga ggtggttcag 30600  
cctgcgttgt gggcggtgat ggtgtcgtg gcgcgggtgt ggcggtcgtg ggtgttccg 30660  
gttgcgtcgg tgggtgggtc ttcgcagggt gagattgccg cggcgacggt ggcgggtgcg 30720  
ttgagtgtgg gtgatgcggc gcgggtggtg gcgttgcgga gccgtttgat cgcggagcgt 30780  
ctgtcggggc tgggtgggat ggtttcgggt gcgttgctgc gtgagcgggt ggtgtcgttg 30840  
atcgcgggtg tgccgggtgt gtcgggtggc gcggtgaacg gttcttcgtc gacggtggtc 30900  
tcgggtgagg ccgcggggct ggagagggtg ctggccgcgt gtgtgtcgtc ggggggttcg 30960  
gcgcgtcgta tcgatgtgga ttacgcctcg cattcggtgc aggtggagtt gatccgtgag 31020  
gagttgttgg gggttctgga cgggatcgtc ccgcgctcgg gtgagattcc gttcgtgtcc 31080  
acggtgacgg gtgagcggat cgacactgtc gagctggggg cggagtactg gtaccgcaat 31140  
ctccgtcaga cagtggaatt ccagtcggtg gtggagggtc tggtcgctca ggggtgtcgg 31200  
gtgttcctgg agtccagtcc gcatccggtg ttgacggctg gcatcgagga gtccgcggt 31260  
cgggtcgtgg cgttgagtc gctgcgtcgt ggcgagggtg gtctgcggcg gttggtggat 31320  
gcggccggtg aggcgtgggt gcgtggggtg ccgatcgact ggcgggggat gctcgcggc 31380  
ggccggcggg tcgacctgcc cacctatccc ttccaacacc agccctactg gctcgactca 31440  
ccacgacacc ctgccggaga cgtgaccgcc gtcggtctca cagaggccgg tcacgcgttc 31500  
gtgccggcgg cgttcgacct gccggacggg cagegggtct ggacgggacg actgtcgtt 31560  
ccctcctacc cgtggctggc cgatcatcag gtgctcgggc aggtgctgct ccccggcgtg 31620  
gtctgggtcg aactcgcct gcacgcgggg caccaggccg gatgcgactc tgtcgatgag 31680

ctcacccctac agtcgcgcgt cgtgctcggg gcgtccgaca ccgtacaggt gagggtcgtc 31740  
gtcacggaga ccgaagagcc cggcaccgc accgtgtcga tgactcgcg ccgtgacgac 31800  
ggcagctggg tgactcacgc cgaggggatc ctcggggagg gcgggcccgc gccggagccg 31860  
ctgccggaat ggccgcccgc cggcgccatg cccctcgatg tcgagggtt ctacgacgag 31920  
ctcgcgggcg gcggctacca ctacgggcct cagttccgct gcctgcggcg cgcctggcgt 31980  
gccggtgagg atctcgtcgc cgagatctcg ctgccggagg gcaccgacgt cgatgcgtac 32040  
ggcctgcacc ctggactctt cgacgcggcg gtgcacagcg tggcctgcgc ccggacgagc 32100  
gcggggggcg gcgatgacgg tccccggctg ccgttcgcct tctcgagcgt ccggctcttc 32160  
gcgaccgggg tgacctcgct acgggtccgg atcgatccgc agaactcctc gtggcaggcg 32220  
tggaacgaat ccgggtgccc ggtcctcacc atcgggcggc tcgccggccg gcctgtcgac 32280  
gccgatcagt tcgccgtgcg gcgggcccgc cacctcttcc gcgtcgaaac gcggcacgaa 32340  
gccctggccg gcccgcccc cgctcctgg gcggtcacg gagcgaccc gcccggtac 32400  
ggcgagccc tggaggccac gggcgcgag gtgacgacgg ctgccgacct ggccggtctc 32460  
acatcggcac ccgaagccgc cctgttcacg ctccccggca caaaggacgc gggggtcacc 32520  
gaggaggtgc cgaccgtgt ccgggaggcg accgctcagg tgctggagg gctgcaggac 32580  
tggtcaccg acggacgtt cgacgatgcc cgactggtcg tcgtaagccg cgaagcggaa 32640  
gacggcgatc tctccacgg aacggcgcg gcactgctgc gcgccgaca ggccgagcac 32700  
ccggaccgca tcacccttgt cgacctcgat gtcctcccg cctcgctcac ggcccttccc 32760  
ggtttcgccc tcgggtccga accggaggtc gtcgtaacgc cgggagacgg cagggcaccg 32820  
cgctggccc gggcgaggc cccaccgga gcgggctcac tgggcacggg cacggctctg 32880  
atcaccggag gcacgggcac cctcggggga ctgctcgccc ggcacctggt ggagacgcac 32940  
ggagtcaccc ggctgctgct ggtcagccga cgaggaccgg ccgccgacgg cgcgaccgg 33000  
ctgcacgcc agctcaccgg gcatggcgca cacgtcgaca tcgtggcggc cgacctcggc 33060  
gaccgcacga gcgtggccgc gctcctcgcc acggtcgacg ccgaccacc cctgtcggcc 33120  
gtcgtgcacg ccgccggagc gctggacgac ggcgtgctcg gcacccggtc cgccgactgg 33180  
ctcgaccgg tctgcgccc caaggcggac gccgcttggc acctgcacga actcaccgcc 33240  
gaactgcctc tgaccgcctt cgctatgtt tctcggccg catccgtgct cggcgcgggc 33300  
ggacaggcca actacgcgc ggccaacgga tttctggacg cactggccgc ccatcgtgcc 33360  
gccccgggac tgccccggac ctcgctggcc tgggggctgt gggagcaccg cagcgaactg 33420  
accgggcaca cgggtcccc ctcccgacg atcgcgccg tcggcgctct gtccaccgcg 33480  
gaggcccttg ccgccttoga ccgggcctg gcctccgggg agccgctggc agtgccgatc 33540  
cggctggagt cgacatccag tgaggaggt cgcggatgc tgcgcgccct ggtccgcgta 33600

cgccgcccgg cgcgccaccg caccgaaccc gcggcgagcg cgggcgccgc gcaggaggtc 33660  
 cggcagctgg ccgagttggg cgcgcacgag cgacagcggc gcgtgcagcg gatcgtgctc 33720  
 gacaccgcgg cggccgtcct cggccatgac agccacgacg ccatccccct caccgggggc 33780  
 ttcttgagc tggggttcga ctccctgaca gcggtacggc tgcgcaaccg gtcgcccgc 33840  
 cgactggggc tgcgcctgcc ggccacggtg gtgttcgacc accccagccc ggccgccttg 33900  
 gccgccacc tggtcgagca tctcgtgggc accgtcgacc cgaccgcgca ggccatggag 33960  
 cagctggagg ctctgcgcg cagcgtgcac gcagccacac ccgccggtgg cctggaccgc 34020  
 gccctggtga cccaacgcct gacggccctg ctcgacgaaa tgcggcacgt cgacggcccc 34080  
 ggccggcacc aaggccccga cggctccggg gacgacctgg agaacgcgac agcggacgag 34140  
 atctacgcc tcatcgacaa cgaactgggc atcgggggta cgcagtgaac ggcgacgaca 34200  
 aagcactggc ctatctcaag cgggtgaccg cggacctgcg gtcggcgaga gccaggctgc 34260  
 aggaactgga gtccgcgcg accgacccca tcgccatcat cggcatgggc tgccgtctgc 34320  
 ccggtggcgt gcgcaccccc gaggacctgt gggacctcgt ggagaagaag catgacgcga 34380  
 tcggcccctt ccccgccgac cgcggatggg acctcgagaa cctgtacgac cccgaccggg 34440  
 acgcgccggg caaggcctac gtccgcgaag gtgggttcgt ccacgacgtc gccggcttcg 34500  
 acgcgggctt ctccggaatc tcgccgcgtg aggcgctggc gatggaccgc caacaccggc 34560  
 ttctgctgga gtgctcgtgg gaggccctgg agcggggcgg catcgaccct tctccctcg 34620  
 agggcaccgc caccggcgtc tacaccgggc tcatgaccca tgaatacgcg acccgactgc 34680  
 cctcgatcga cgaggagttg gaggggtgca tcggcatcgg caacgccgga agcgttgctt 34740  
 cgggcgcggt ctctacacg ctccggcctga acggccccgc tgtcaccgtc gacacggcct 34800  
 gtcctctctc gctcgtcgcc ctgcacctcg ccgcccaagc cctgcgccag ggccagtgc 34860  
 cccttgcgct ggccggaggt gcctccgtca tcgcggcgcc gaccgtgttc gccaccttca 34920  
 gccgacagcg gggcctcgcc cccgacggcc gctgcaaggc gttctcgtcc acgaccgacg 34980  
 gcacgggctt cggcgagggg gtgggcgtac tggctctgga gcgcctctcg gacgcccgtc 35040  
 gcaacggaca cgaggctcct gccgtcgta ggggctcggc ggtcaaccag gacggagcca 35100  
 gcagcggatt caccgccccg aacggaccgt cccagcagga cgtcatccgc gaggccttgg 35160  
 ccgacggtcg actgaccct gcggacgtgg acgtcgtgga gggtcacggt acggggacgc 35220  
 ggttgggtga tccgatcgag gcgcaggcgt tgctggcgac gtacgggcgg gggcgtgacg 35280  
 cggatcgtcc gttgtggctg gggtcggtga agtcgaacat cggtcacacg caggcggccg 35340  
 cgggtgtggc aagcgtgatc aagatggtgc aggcgatgca ggccggcggt ctgccgcgga 35400  
 cgctgcatgt ggacgagccg tcgggtgagg tggattggga ctccgggtgcg gtgcggctgc 35460  
 tgaccgaggc gcgcgagtg ccgtcggggg aggggcgtgt gcggcgggcg ggtgtgtcgt 35520

cgttcgggat ctccgggacg aacgcgcacg tgatccttga ggagccgccg gcggaggacg 35580  
 cgctgccgga gcctgaagcg ggtgatgtgg tgccgtgggt tctttcggcg cggtcggcag 35640  
 aggcgttgcg ggagcaggct gcccggtgg cgtcgggtggc tggtaggttg aacgtggtgg 35700  
 atgtgggctg gtcgttggct tcgacgcgtg cggcggttca gcaccgggcc gtcgtcgtgg 35760  
 gaggcgatcg ggaagagctc ctggggaagc tttcctcgggt ttcgggggtc gaggtcgggg 35820  
 tcggggtcgg tgccgggtgg ggtgtggtgt tgggtgttcgc cggtcagggg tgtcagtggg 35880  
 tcgggtatggg gcgggagttg ctgggttcct cgctggtgtt cgcggagtcg atgcgggagt 35940  
 gcgcggcgcc tctgtcgcg tttgtggact tttctgtggt ggatgttctg ggttcggctg 36000  
 gggagtggg tcgggtcgag gtggttcagc ctgcgttgtg gccgggtgat gtgtcgtgg 36060  
 cgcgggtgtg gcggtcgtgg ggtgttcgg ttgtcgcgtt ggtgggtcat tcgcaggggtg 36120  
 agattgccgc gccgacggtg gccgggtgct tgagtgtggg tgatgcggcg cgggtggtgg 36180  
 cgttgcggag cgttttgatc gcggagcgtc tgcgggggtt gggtaggatg gtttcgggtg 36240  
 cgttgtcgcg tgagcgggtg gtgtcgttga tcgcgggtgt gccgggtgtg tcggtagggg 36300  
 cggtagaacg ttcttcgtcg acggtggtct cgggtgagga cgcggggctg gagagggtgc 36360  
 tggccgcgtg tgtgtcgtcg ggggttcggg cgcgtcgtat cgatgtggat tacgcctcgc 36420  
 attcgggtgca ggtggagttg atccgtgagg agttgttggg ggttctggac gggatcgtcc 36480  
 cgcgtcggg tgagattccg ttcgtgtcca cggtagcggg tgagcggatc gacactgtcg 36540  
 agctgggggc ggagtactgg taccgcaatc tccgtcagac agtggaattc cagtcggtgg 36600  
 tggagggtct ggtcgtcag ggggtcggg tgttcttga gtccagtcg catccggtgt 36660  
 tgacggtcgg catcgaggag tccgcggatc gggtcgtggc gttggagtgc ctgcgtcgtg 36720  
 gcgagggtgg tctgcggcgg ttggtggatg cggccggtga gccgtgggtg cgtgggggtg 36780  
 cgatcgactg gccggggatg ctgcgccgg gccggcggtt cgacctgcc acctatccct 36840  
 tccaacacca gccctactgg ctcgactcac cagcacacc tgccggagac gtgaccggcc 36900  
 cgggcgacga cgagttctgg gcggccgtgg agcacggtga gccgaccgag ttggcggacc 36960  
 tgctccggag gtcggcgggc gagccggggc aggatcttca cgcaccgtc gcggccctgc 37020  
 tgccgacgct tgcaacgtgg cgtcgggacc gccagcgcag gccggctgtg gactcctggc 37080  
 ggtaccgat cgtatggcgt ccggtcgcca cgcctcgtg cgacagggtg ctgtcggggc 37140  
 gctgggctgt cgtcgtgcc gccggtcacg aggacgacc cgtcgtcgac tgggtctgct 37200  
 cggcgtcgc ggaccacggg gccgagccc aacgcattgt gctgggccc cgggagagcc 37260  
 gttcggcgtt gccacgcgg ctggccgcc atcccccg gggcgtggtc tccctgctcg 37320  
 gactgagcgg gccggcgcac cccgaccaag aggtgctgcc cagtgccgtc gccggtaccg 37380  
 tctgcttgc ccaggccctc tccgacggcg ccgtacgagc accggtgtgg acctgacct 37440

gcaacggtgt gtccgcgacg gcgacggacc cgggtggctcc cacgcacgcc gcgcaggtgt 37500  
 gggccgtggc acggtggcc ggtctggagc acccgaggc gtgggtgggt ctgctcgacc 37560  
 tgccggaccg tctcgacgac cgcgcggccg cccggttcgc cgcggtcctg tccgcgggcg 37620  
 aggacgagga ccaactggca ttacgcgacg ctgggttgcg ggcacgaagg ctggtgcgtg 37680  
 cccccgttc gcgcgacgcg gtgaccgccg gctggcagcc ccgcgacaca gcgctcgta 37740  
 cgggcccgaac cggcgggtctc ggcgggcagg tcgcccgtg gctggcggcc gcgggcgtac 37800  
 ggcacctcgt gctggtcagc cgtcggggg cgaggcgga ggcgcagac cgtctgcgcg 37860  
 acgacctcac cgccctcgcc gtacaggtga cgttcggcgc gtgcgacgtc gcggaccgcg 37920  
 ccgogctctc ggcgctcctc gaccgggttc aggaggacgg cccgccgatc cgcacggtcg 37980  
 tgcacgcggc gggctccggt cgcgccgcca ggctgctgga caccgacgcc gaggagaccg 38040  
 cggcgggtgct gcgggcgaag tcggccggag cccggaacct gcacgaactc ctgatgacg 38100  
 tggacgcgtt cgtgctgttc tcctccggag cgggtgtgtg gggaagcagc gcccagggcg 38160  
 cctacgcggc ggccaacgcc tacctggacg cactggccga acagcgcagg ggcaggggc 38220  
 ggccggcgac ctccgtcgcc tggggcgccct gggccggtga cggcatgaca gccgccgccg 38280  
 gcgaggaatg gtggagcagg cagggctctgc ggttcatggc ccctgaggcc gccctcgacg 38340  
 cgctgcgcca ggccgtcgac cgcgccgaga gcacgctcgt cgtcgcagac atcgactgga 38400  
 agacgttcgc tcccctcttc acgtcggccc gcagccgccc cctcatcacc gacatacctg 38460  
 aagcccgccc cgaaccgagg ccggaaggcg cggaccagcc tacgcagggc ctggtggcca 38520  
 agctggcgggt gctgtccgcg gacgaacggc ggcgcgccct gctcgcgag gtgcgggcgc 38580  
 aggcagcgggt ggtgctcggc cccccggcg cggacgcgt accggtcgac cggccgttc 38640  
 gcgagctcgg attcgactcc ctacgcggc tgaactgcg caacaggatc gttgctgcca 38700  
 ccgggctcga gcttcggcc accctggtct togaccacc cacgtccacg gcgctcgccg 38760  
 cctacctggg cggccggctc ggaatcgacg gcgccccgc ggggtccact ctgctggaag 38820  
 acctcgcgcg gctcgagtc accgtcgcca ccctgaccgc ggcacctctc gcagagaccg 38880  
 tgccggacgc ccgggaccgc gggcgctca ccacacggt gcgggcgttg ctggagcgg 38940  
 gggaccaggc cgatggcgag gaccaggccg ccgcccgaga agaactcgac gatctgagcg 39000  
 acgacgacct ctctgacttc atcgacgcga agttcggccg ttcgtgacct cggtcggccg 39060  
 ccgccaactc cacgtacacc ccgaagacca cgatcaccac gcgaaaagga cgggcctctc 39120  
 catgggggac gagcagaaac tccgcaccta cctccggcgc gtcactgccg acctggccga 39180  
 cgtgacggag cggttgcagc gagcagagga caagaacgcc gagccgatcg cgatcgtcgg 39240  
 catgggggtgc cgctaccccg gtgggggtgcg gtcgcccgag gagttctgga acctgctcga 39300  
 cgaaggcgtc gacgcagtgg ccggcttccc cgaggaccgt ggctgggacc tggagaacct 39360

gtacgacccc gaccccgcag agccgggtaa gtgctatgcc cgcgaaggcg ggttcctcta 39420  
 cgacgcgggc gagttcgacg ccgcgttctt cgggatatcg ccccgcgagg ccctgtccat 39480  
 ggacccgcag cagcggctgc tgctggagtg ctctggagt gccctcgagc gggcgggcat 39540  
 cgacccgggc tcgctgcgcg gcaaagacgt cggcgtgtac gtcggcgcat ggaacagcaa 39600  
 ctacggcagg ggcggcgggg cggagagctc cgagggccac ctgctgaccg gcaacgcctc 39660  
 cagcgtggtc tcgggtcgcg tggcgtacgt gctggggctc gaaggccccg ccgtcaccat 39720  
 cgacaccgcc tgttctctct ccctggtcgg cctgcacctg gccgcccagg ccctcaggtc 39780  
 cggcgagtgc ggtcttgccg tggccggcgg cgtcacctg atgtccacc ctctgtcgct 39840  
 ggtgtccttc tcccggcagc gggggctcgc acaggacggt cgttccaagg cgttctcggc 39900  
 ggacgcgat ggcatgggca tggccgaagg tgtaggcgta ctggctctgg agcgctctc 39960  
 ggaggcgcg cgcaacgggc acgaggtcct ggccgtcctg cggagctcgg ccgtgaacca 40020  
 ggatggtgcc tcgaacggtc tgagcgcccc gaacggggccg gcgcagcagc gtgtcatcca 40080  
 gtccgccctg accgtcggcc gtctcgcccc ctccgacatc gacgtcgtcg aggccacagg 40140  
 caccggcacg gccctcggcg atccgatcga ggcgcaggcg ttgctggcga cgtacgggcg 40200  
 ggggcgtgat gcggtatctc cgttggtggc ggggtcgggt aagtcgaaca tcggtcacac 40260  
 gcaggcggcc gcgggtgtgg ccggggtcac caagatggtg ctggccctgc gcaaggcgct 40320  
 actgccgcgg acgttgcatg tggatgagcc aaccggtgag gtggattggg actcgggtgc 40380  
 ggtgcggctg ctgaccgagg cgcgcgagtg gccgtcgggg gaggggcgtg tgcggcgggc 40440  
 ggggtgtctg tcgttcggga tctccgggac gaacgcgcat gtgatcgtcg aggaggctcc 40500  
 ggaggaggag ccccggccgg aggtccttc cgtcgacgtg gtgccgtggg ttctttcggc 40560  
 gcggtcggca gaggcgttgc gggagcagge tgcccggctg gcgtcgggtg ctggtgggtt 40620  
 gaacgtggtg gatgtgggtt ggtcgttggc ttcgacgcgt gcggcggtcg agcaccgggc 40680  
 cgtggtggtg gggcgggact ccgaggaatt ggtgtcgggg ctttctctcg tttcgggggt 40740  
 cgaggtcggg gtcggggctg gtgccgggtg tgggtgtgtg ttggtgttcg ccggtcaggg 40800  
 gtgtcagtgg gtcggtatgg ggcgggagtt gctgggttcc tcgctggtgt tcgcggagtc 40860  
 gatgcgggag tgtgcggcg ctctgtcgcc gtttgtggac ttttctgtgg tggatgttct 40920  
 gggttcggct ggggagttgg gtcgggtcga ggtggttcag cctgcgttgt gggcggtgat 40980  
 ggtgtcgtg gcgcgggtgt ggcggctcgt ggggtgttcg gttgctgcgg tgggtgggtca 41040  
 ttcgcagggt gagattgccg cggcgacggt ggcgggtgcg ttgagtgtgg gtgatgcggc 41100  
 gcgggtggtg gcgttgcgga gccgtttgat cgcggagcgt ctgtcggggc tgggtgggat 41160  
 ggtttcggtg gcgttgctgc gtgagcgggt ggtgtcgttg atcgcgggtg tgccgggtgt 41220  
 gtcgggtggc gcggtgaacg gttcttcgtc gacggtggtc tcgggtgagg ccgcggggct 41280

ggagaggggtg ctggccgcgt gtgtgtcgtc gggggttcgg gcgcgtcgta tcgatgtgga 41340  
 ttacgcctcg cattcggtgc aggtggagtt gatccgtgag gagttgttgg gggttctgga 41400  
 cgggatcgtc ccgcgctcgg gtgagattcc gttcgtgtcc acggtgacgg gtgagcggat 41460  
 cgacactgtc gagctggggg cggagtactg gtaccgcaat ctccgtcaga cagtgggaatt 41520  
 ccaagcatcc gtgcagacgc tcctcgccca ggggcaccag gtcttcctgg agtccagtcc 41580  
 gcacccgggtt ctacccgtcg gcatcgagga gaccgttcac gagagcgccg cacaggccgt 41640  
 cgttctggga agcctgcggc gggacgaggg tgccctcacc cggctcgtca cctccgccgg 41700  
 tgaggcatgg gcgcgcggtg tgcccgctga ctgggcgggc atgctcgccg gcggcaggcg 41760  
 ggtcgagttg cccacgtatc ccttcctccg ggagcggctg tggttgaggc cgtcgcgctc 41820  
 ccgcaccggg aacctcaaca tggccgggct ggtcgaagcc ggacatgaaa tcctgcccgc 41880  
 cgcagtggag ttgcccggag agcagtgggt gtggaccggc gagctgtcgc tctccgcgta 41940  
 cccgtggctg gccgatcacc aggtgctcgg gcagaccctg gtgccggggc tggcgtgggt 42000  
 cgaactcgcc ctgcacgcgg gccaccagct cggtttcgga tcgctcgagg aactcaccct 42060  
 gcaggcaccg ctcggtgctc gcgagtcgga cgcctgcag gtcagagtcg ttgtctccga 42120  
 tctcggggag agtgatcgcc gggcagtgtc ggtgcactcg cgtggtgacg accagacgtg 42180  
 ggtgacccat gcggagggat tcctcaccgc gaaagggggc cagccggaga ccatggccgt 42240  
 gtggccgccg tccggtgcgg agccggtgga ggctgacggg ttctacgaac gcctcgccga 42300  
 tgcgggggtac cactatggcc cggctctcca gggcgtgagc aaggctctggc gagctggcga 42360  
 ggagatctac gccgaggtcg ggctgctcga cgacgcgac gtggacggct tcggcatcca 42420  
 ccccgccctg ctcgacgccg ccctgcagac cgcctacgtc gcccaacggg gccccgcaga 42480  
 gacgaagttg cctttcgcgt tcggcgatgt acagctgttc gccaccgggt cccggctcgt 42540  
 ccgcgtacgg gtctcgccgg ccgctcagca ggggatggcg tgggaggcct gggacccac 42600  
 cggacttccg gtgttctccc tcgggtacct ggcgacccgg ccggtcgacc gcggccagct 42660  
 gaccgtgaag cggcccagat cgtgttcaa ggtggcctgg gacgagaccg tccccgtcgt 42720  
 cgggaatgcg accgcgcgc atggcgctgt gctgggcgac gaccggttcg ccctcggtgc 42780  
 cgcgctgcgc gcggcgggct gggaggtcgg ggccgccccg gaaccgcgt ccgccgacac 42840  
 cgccgccgaa gtactgctgc tgccctgcac cgcgcccggc gagccggacg cggacctgcc 42900  
 caccgcggtc agggccgtga ctgctcgggt gctcggcgtc ctacaggagt ggctcgccga 42960  
 cgaacggctc gccggcacc gactggccgt cgtgaccgc aacgccctgc cgggtgacct 43020  
 cctgcacagc cccgtctggg gtctcgtgcg ctccgcccag accgagaacc ccgggcgcat 43080  
 caccctcgtc gacctcgacg accaccccga ctcggcggcc gtccttgccg aggcggtcca 43140  
 gtccgacgag ccgcgcatca tgggtccgca gggccggccc accgccgccc gcctgggtccg 43200

tgccaccgca cccgagctgg tgccgcccgc cggagccgat gcctggcgcc tcgagatcac 43260  
 cgaaccgggc acgttcgaca acctcacgct gggcgtctac ccgcacgccg agaagaccct 43320  
 cgccgacaac gaggtccggg tcgccgtcca cgcgggcggc ctcaacttcc acgacgtggt 43380  
 cgccgcactc ggcattggtc aggacgacct gacctcggc cgtgaggcgg ccggcgctcgt 43440  
 cgctcaggtc ggagacgccg tgccggatct gacccccggc gaccacgtga tgggcatcct 43500  
 gtccctccggc ttccggccgc tcgccgtcac cgatcacccg tacctggcac gcatgcccga 43560  
 gggctggacg ttcccccagg cggcttcggt gcccgccgcg ttccctgacgg cctactacgg 43620  
 gctgtgcgac ctccggcggc tccgcgcggg cgaccgcgtc ctcatccacg cggccgcggg 43680  
 cgggtgcggc atggccgccg tacagatcgc ccggcacctc ggggcggagg tgttcggcac 43740  
 cgccagcccc cgcaagtggg gcgcgctgcg cgccctgggg ctcgacgacg cccacctgtc 43800  
 ctccctccgc acctcgcact tcgagcagga gttccctggc gccaccgacg gcaggggagt 43860  
 cgacctcggt ctgaactcgc tggcccggga gttcgtcgac gcctcgtcgc ggctgatgcc 43920  
 cggcgccggc cgggttcgtg acatgggcaa gaccgacatc cggcgccggg aacagggtggc 43980  
 ggaggaccac ggcggagtcg cctaccaggc attcgacctc gtcgaggccg ggccgcagcg 44040  
 cacgggggag atgctcgcg agatcgtccg gctcttccaa gccggcgcggt tccggccgct 44100  
 gccgatcacc cagtgggacg tgcgcggggc gccggaggcc ttccgacaca tcagccaggc 44160  
 caagcacata ggcaagatcg tccctaccgt gccccggccc atcgacaccg acggcacctg 44220  
 catggtcacc ggccgccacc ggacctggg cggcttcgtc gcccggcacc tggtcaccca 44280  
 tcacggcata cgacgactgc tgctggtcag ccgcagcgcg gagcgacccg acctggtgcg 44340  
 ggaactcacc gagctgggcg ccgacgtcac ctgggcctcc tgcgacctag ccgacgccac 44400  
 cgccgtcgaa gagaccgttc ggtccgtcga cgaacggcat ccgctcgtgg ccgtcgtcca 44460  
 ctctgcggga gtactcgacg acggcgctcat cgacaagcag agccccgaac ggctcgacac 44520  
 cgtgatgcgt cccaaggctc agcccgctg gaatctgcac cgactcctcg acaacgcccc 44580  
 gctggccgac ttctgtctct tctccctccg cagcggcgtg ctccgtggcg ccggacagtc 44640  
 caactacgcg gccgccaacg ccttccctga cgcgtcgcg gagcaccgcc gtgcacaggg 44700  
 cctcgccgga caggcgctcg cctggggact gtggtccgac cgcagcacga tgacgggaca 44760  
 gctcggctcc accgaactcg ccgggatcgc ccgcaacggc gtcgccgaga tgtccgagac 44820  
 ggagggcctg gccctcttcg acgccgcccg ggacaccgcc gaggcggtgt tgctgcccac 44880  
 gcacctggac gtcgcgagge tccgcagccg caacggagag gtaccgcggg tgttccgccg 44940  
 gctgatccac gccacggccc gccgcaccgc gagcaccgcg gtccgcagcg ccggcctcga 45000  
 acagcagctc gcctcgtgtt ccggccccga acgcacggag ctgctcctgg gactggtgcg 45060  
 cgaccatgcc gccgcggtgc tcggccacgg cacctccgac gccgtctcgc cggaccggcc 45120



cttccgcgac ctgggtttcg actccctgac tgccgtggag ctgcgtaaca ggttcgccgc 45180  
 cctcaccggc ctgcgtctgc eggccacgct cgtcttcgac cacccgagcc cgacggccct 45240  
 cgccggggcac ctgcggggcc tgctggggcg cgcgacggcc tccgcggccg agccgggtcct 45300  
 ggccgcgcgtc ggacgggtgc gcgcgcacct ccggtcgctc accccggacg ccgagggcg 45360  
 cgaggacgtg acgatccagc tggaggccct cctcgccgag tggcgggagg ccgcgagaa 45420  
 gcgggctccg gaggcggctg gtgacgagga cctgtccacc gccaccgacg acgagatctt 45480  
 cgcgctcgtc gacagcgaac tgggtgaggc ctgatgacgg ccgaagcgtc tcaggacaag 45540  
 ctgcgtgact atctgcgaaa gaccctcgcc gacctcgga ccaccaagca acggctacgc 45600  
 gacaccgaac gcagggcgac cgagcctgtc gcgatcgctg gcatgagctg ccgactgccc 45660  
 ggcgacgtac ggacaccgga gcggttctgg gaactcctcg aactggaac cgacgccttg 45720  
 acgcccttgc ccaccgaccg cggctggaat ctgcacacgg cgttcgacga cgaacggccg 45780  
 taccggcgcg aaggcggatt cctttacgac gccggacggt tcgacgccga gttcttcggc 45840  
 atctcgcccc gtgaggcgct ggccatggac cctcagcagc ggctgctcct cgaaagctcg 45900  
 tgggaggcga tcgagcacgc ccgcatcgac ccaggtccc tgcacggcag tcgcaccggc 45960  
 gtctgggttcg gcacgatcgg ccaggactac ttctccctct tcgcgcgcatc cggcggcgag 46020  
 cacgccaact acttgccac cgctgctcg gccagcgtga tgtccggccg cgtctcgta 46080  
 gtgctcggcc tggaggggcc cgctgtcacg gtcgacacgg cgtgctcgtc ctccctggtc 46140  
 gccctccact ccgccgtaca ggccctgagg tccggcgagt gcgaactggc tctcgccggg 46200  
 ggcgccacgg tcatggccac cccgacggtg ttcaccgcct tctcccatca gcgtggcctg 46260  
 gccggtgacg gccgctgcaa ggcttcgcg gcgggtgccc acggggcggg cttcgccgag 46320  
 ggggtgggcg tgctgggtgt ggagcgggtg tcgggtggcg ggcggaacgg tcatcgggtg 46380  
 ttggcgggtg tgcggggttc ggcggtgaac caggacggtg cgtcgaacgg tctgacggcg 46440  
 ccgaacggtc cgtcgagca gcgggtgatc cgcgcgcgcg tggccaacgc gcgcttggcg 46500  
 ccggaggacg tggacgtgt cgaaggccac ggcacgggga cttcgctggg cgacccgatc 46560  
 gaggcgcagg cgttgctggc gacgtacggg cggggccggg acgcggagcg tccgttgtgg 46620  
 ctggggtcgg tgaagtcgaa catcggtcat gcgcaggctg ctgccggtgt cgccggtgtc 46680  
 atcaagatgg tgctggccat ggagaagggc cgtctccctc ggacgctgca tgtggatgag 46740  
 ccgtcgggtg aggtggactg ggactcgggt gcggtacggc tgctgaccga ggcgcgggac 46800  
 tggccgtcgg gggagggcg ggtgcggcg gcgggagtgt cgtcgctcgg gatctccggg 46860  
 acgaacgcgc acgtgatcat cgaggagccg caggaggagg aagcggcacc ggattcctct 46920  
 gcttcgggtg ccgtgccgtg ggtgctctcg gcgcgatcgg ccgaagcgtt gcaggctctg 46980  
 gcttcacaac tcgcgacca cagcgccaaa tcgagtcggg tggatgtggg ttggtcggtg 47040

gtttcgacgc gtgcggcggtt cgagcatcgg gccgtggtgg tggggcgcggt gcgggacgag 47100  
 ttggtgcggg gcttgctcca ggtcgcgcag ggtcggggcg tgaggggtgt cgcgtcttcg 47160  
 gcgtcgggtg gtctcgcgtt tgtttttgct ggtcagggca gtcagcgggt ggggatgggg 47220  
 cgggggttgt atgagcgggt cccggtgttt gccgagcggt tcgacgaggt gtgtgggcgg 47280  
 gtcggtccgg ggggtgcggga ggttggtttc ggttcggatg cgggtgagtt ggaccggacg 47340  
 gtgtgggcgc aggcgggggt gttcgcgttg gaggtggcgc tgtttcgggt gttggagtcc 47400  
 tgggggtgtgc ggccggggtt tctgatcggg cattcggtcg gtgagttgtc ggccgctgt 47460  
 gtggcgggggt tgtggtcgtt ggaggatgcg tgcgggtcg tggtgcccg ggccggttg 47520  
 atgcagcggt tgcggcgggg tggggtgatg gtcgcggttc gggccgaggg gggggagctg 47580  
 gccggtttcc tcggtgagga cgtggtgatc gcgtcgtga acgcgccggg gcaggtggtg 47640  
 atcgtggtc ctgagggggg tgtggagcgt gtggtggctg cttgtggggc gcggtcgcgt 47700  
 cgtctggcgg tctcgcacgc ttttcattcg ctttggtgg agccgatgct gggggagttc 47760  
 cgtcgggttg tggagtcggt ggcgttcggt gtgccgtcgt tgcgggtggt ttccaatgtc 47820  
 acgggtgcgt ggggtggatcc ggaggagtgg gggacgccgg agtactgggt gcgtcaggtc 47880  
 cgtgagccgg tgcgtttcgc cgacggggtc gccacgttc tcgacgcggg tgtgaggacg 47940  
 ttctctgagc tgggtcccgc tgggacgctc acttcgatgg tcagccactg cgcggacgcc 48000  
 accgccactt cgggtgacgc tgtacctacc ctgcgccccg atcacgacga gtcgcggacc 48060  
 gtgttgagtg ccgcagcgtc cttgtacgtc cagggtcacc cggtcgactg ggccccgctg 48120  
 ttcccgcggg ccgcacggt ggacctgcc acctaccct tccagacca gcactactgg 48180  
 atggaaagcg cgcggcgcc caccgtcgag gacacccgc gcgagccct cgacggctgg 48240  
 acgcaccgca tcgactgggt gccgtggtg gacgaggaac cggcgcccg cctggccggt 48300  
 acctggctgc tcgttcgtcc cgaagaaggt cccgcgccgc tcgccgacgc cgtcgcggac 48360  
 gcgctgacct ggcacggcgc ctccgtcgtc gaggcgctc gtgtcccgca ccaatccgac 48420  
 accgagctga ccggagtcgt ctctctgtg gggccggggc ccgacggcga cggcggcctg 48480  
 gacgcgacct tgcggctggt acaggacttg gccaccgcc ggtccaccgc gcccttggtg 48540  
 atcgtcacca gcggagccgt ggccgtcgg acgtccgaca ccgtgccgaa ccccgagcag 48600  
 gcgacgtctt ggggggttgg cggggcggg gccaccgagt ggccggcct gggggcgggc 48660  
 cgcacgacct tgcccgcga cctcaccgag caggctcgac gtcggctctg cggccggctg 48720  
 ctcgaccgga gtgagcagga gacggcggtc cgacaggccg ggtgttcgc caggcggctg 48780  
 gtccgtgcc gtaccagca cggccgggtg acgccgcgc gcaccgtgct ggtcaccggc 48840  
 gggaccggcg cgtcgcgg acacgtcgc cgatggctgg cggaggagg ggcgagcac 48900  
 atcgtgctgg ccgggcgcag agggcccgac ggtcagggcg ccgaggcgt gcgcgccgac 48960

ctgggtcgccg caggggtcaa ggcgacgac gtgcgctgcg acgtcgccga ccgggatgcc 49020  
 gtacgtctgc tccctggacgc acaccggccc agcgccatcg tgcacacggc cggggtcgtc 49080  
 gacgacggac tgctcacctc gctgacgccc gccaggtcg agcgggtgct gcggcccaag 49140  
 ctgctcgccg ccaggaacct gcatgagctg acccgggacc gggaactgga cgccttcgtg 49200  
 ctgtttctct cctcgccgg agtcctcggc ggggcagggc aggccaaacta cgcgctgcc 49260  
 aacgcctact tggacgccct ggccgcacac cgcaccgcgc atgggctgcc ggccggcctcg 49320  
 ctggcatggg ggccgtggga gggcgacggc atggccgcgg cgcaggaggc cgcgaccgg 49380  
 ctccgcccga gcggtctcac cccgctgccg ccggagcagg ccgtacgggc cctcgccgg 49440  
 ggccacgggc cgctggtggt ggccgacgcg gactgggcgc ggctggccgc cggctcgacg 49500  
 cagcgctgc tcgacgagct tcccaggtg cgtgcggtca ggccggcggga gcctgctgtc 49560  
 ggacagcgcc ccgacctacc ggcccgggtg gcggggcgtc cggccgagga gcagtccgcg 49620  
 gtactgctgg aggcggtccg ggaggagatc gccgccgtac tgcgttaacg cgatccggcg 49680  
 cggatcggcg ccgatcacga gttcctcgcc ctcggttcg actcgctgac atcgatcgaa 49740  
 ctgcgcaaca ggcttgccac gcgcatcggc ctgacgttc ccgcgacgt caccctggaa 49800  
 cagcgacccc ctgccgggt cgcgcgcac ctgcgcgagc ggatcgcgga ccggcccgtc 49860  
 gggtcgggtg ccgtcccgt gcccgggagc gctgatgtcc cggaggcggg cggcggtagc 49920  
 ggccctcggt agctgtggca ggaagccgac cggcacggcc ggccgctgga gttcatcgac 49980  
 gtactcaccg cggccgcgc cttccggccc gcctaccgtg aaccggccga gctggagctg 50040  
 ccgcctctac ggctcacctc cggcggggac gagccgccc tgttctgcat cccctcgac 50100  
 ctcggaagg ccgaccgca caagttctg cggttcgccg cggccctgcg gggacggcgg 50160  
 gacgtcttcg tctgcgcca gcccggttc gtaccgggc agccctgcc cgcgggcctc 50220  
 gacgtcctgc tcgacacca cgcgcgggccc atggccgggc acgaccggcc cgtgctgtc 50280  
 ggctactcgg ccggcgggtc tgccgcgag gcgttgccg cccgactgc cgagctcggc 50340  
 aggcgcggc cggccgtcgt gctcgctgac acctatgcc ccgacgagac ggagggtgatg 50400  
 gcccgatatc agggcgccat ggagcaggc cagcgcgac gcgacggcag gaccggtgcc 50460  
 gccttcgggt aggcctggct caccgcgatg ggccactact tcggcttcga ctggacccc 50520  
 tgtccggtc acgtgccgt gctgcacgta cgcgccggc accccatgac cggtatgcc 50580  
 gtcgaagggc ggtggcaggc gcgctggaac ctgccgcaca ccgccgtcga cgtgcccgga 50640  
 gaccacttca cgatgatgga ggatcacgcc ccgcgcaccg ccgacaccgt gcacgactgg 50700  
 ctgggcacgg ccgtccgccc ccctgagaga accgcgact gacgactgc cggcgacagc 50760  
 ggcattccgc cctgtccct tctgtccgt ccgttccct tctctctc gaaacggagt 50820  
 tcgttctcat gccttcttc cccgtacgc ggtccgtgcc cgacactccg cccgcccagc 50880

acctcgaact gctcaaggag agcggcgggcg tctgcccctt caccatggag gacggccgtc 50940  
 cggcctggct cgcgccagc cagcagccg tgcgtccct gtcgcccagc cgccgtatca 51000  
 gcaacaaccc ggcgaagacg ccgccccttct cgcagcggga ggccctgcag aaggagcggg 51060  
 gccagttcag ccgtcacctg ttcaacatgg actcgccgga gcacgacgtg gcccgccgca 51120  
 tgatcgcgga ggacttcact ccccggcacg ccgaggcggt ccggccgtac ttcgaggagg 51180  
 tgttcggcga gatcgctgac gaagtgggtcc acaagggccc accggccgag atgatcgagt 51240  
 cgttcgcctt cccggctgcc acccgcacca tctgcaaggt gctggacatt ccggaggacg 51300  
 actgcgagta cttccagaag cgcaccgagc agatcatcga gatggaccgc ggcgaggaga 51360  
 acctcgaagc cgtcgtcgaa ctgogccgct acgtcgacag cgtcatgcag cagcgacccc 51420  
 gcaagcccgg cgacgacctg ctcagcagga tgatcgtcaa ggcaaggcg tccaaggaga 51480  
 tcgagctcag cgacgccgac ctggctcgaca acgcgatgtt cctgctggtg gccgggcaag 51540  
 agccgtoggc caacatgctg ggcctcggcg tgctcgccct cgccgaattc ccggacgtgg 51600  
 ccgaggaact gggggccgag ccgcacctgt ggccggggcg gatcgacgag atgctccgct 51660  
 actacacat cgcccggggc accaagcggg tcgcggccgc cgacatcgag tacgaggggc 51720  
 acacgatcaa ggagggggac gccgtcatcg tgctcctcga caccagcaac cgcgacccga 51780  
 aggtgcacgc cgaaccgaac cggctcgaca tccaccgctc ggccgggcaac cacctggcct 51840  
 tcagccaagg accgcaccag tgccctgggca agcacctcgt ccgggtccaa ctggagatcg 51900  
 cgctcggggc tgtcgccgag cggctgcccg gcctgcgcct ggacatcgcc aaggaggaca 51960  
 tccccttccg cggtgacgcc ctgtcctacg ggccgcgcca gctgcgcgtc acctggtaac 52020  
 agccaccatc ggcccccgcc gcggaccggg cagcacgacc cggtcgcgcg cgggggcacc 52080  
 accaccgtca acatccccag agaggcttcc ccgtggagaa gaccgacgtc gaccggctgc 52140  
 gcacactcga ccgagagcac atgtggtacc cgtggacgcc gatgaccgag tggatggccc 52200  
 gtgatcagct cgtcgtcgaa cgcgccgaag gctgctggct gatcgacgca gacggtaagc 52260  
 gctacctcga cggccgctcg tcgatgggca tgaacctgca cggccacggc cgcagcgaga 52320  
 tagtcgaggc cctggtcgcc caggcgcgca aggccggtga gaccacgctc taccgctct 52380  
 cgcacccggc ggcggtggaa ctgcgccccc gcctggcatc gatggcgccg gccgggctcc 52440  
 agcgcgtctt cttcgccgag tccggatcga ccgcggtgga gacggctctc aaggctgcct 52500  
 acgcctactg ggtcgcgaag ggcgaaccgc agcgatccac cttcgtgtcc atggagggcg 52560  
 gttaccacgg cgagacccta ggcacgggtc gcctgcgcgg caccaacggc gaacaggtcg 52620  
 acatgatccg caagacctac gagccactgt tgttcccctc cctctccttc caccagcccc 52680  
 actgctaccg gtgtcccgtc ggccagtcgt cggacagcga ctgcgggctg gagtgcaccg 52740  
 attcgctgga gaacctctc acccggggaga agggccggat cgccgcggtc atcgtcgagc 52800

cgcggtgcc ggcctcgcc ggagtgatca cgcggcgga gggacacctc gcgaaggtcg 52860  
 cggagatcac ccgcaggcac ggagtgtcc tcacgtcga cgaggtcctc accggctggg 52920  
 cccgcaccgg cccgacgttc tctgtcgagg ccgagggcgt cacaccggat ctgatgacgg 52980  
 tgggcaaggc gctgaccggc ggatatctgc cgctgtcggc caccttggcc acggaggaga 53040  
 tcttcggagc cttccgtgag agcgtcttcc tcagcggcag cacctactcc ggatacgcgc 53100  
 tcggggcggc cgctgcctcg gccagcctcg acctgttcga gaaggaggac gtaccggccc 53160  
 gggccaaggc gctgcgcgac gtgtcacca ccgcactgga acccttcgc gcgtcaccc 53220  
 acgtcgggtga cgctcggcag ctccgctca tcgcggcgt cgagctggtg gccgaccggg 53280  
 agaccgcgc cccctaccgg cccaggagc gcgtcgtcga tcgcatctgc accctggcca 53340  
 gggacaacgg cggtgtggtc aacgcgtcc ccggggacgt gatcaccatg ctgccctcac 53400  
 cgctgatgag ccccgacgac ctgcgcttcc tcaccggcac cctgtacacg gccgtccgag 53460  
 aggtgaccga agagtgaag ggctgatgag ggcgccgctc atcgtgcct gggggcgccc 53520  
 cgagcggctg accctggacc gggtcgaacg gccgtcaccc ccgcccggat ggatcgccgt 53580  
 acgcgtcgag gcctgcgccc tgaaccacct cgacatccac gtgcgcaacg ggcttcggg 53640  
 cgtaaggctg gaactccgc acgtctccgg cggcgacgtc gtcggcgctc tcgagcaggc 53700  
 caccgacgag gcgggggaga gactgtcgg cagccgtgtg ctgctcgacc cgatgatcgg 53760  
 gcgcggcatc ctccggcagc actactggg cgggctcgcc gactacgtc tcgcaccgc 53820  
 ccacaacgcg ctccccgtcc ccgatcagga cgcggaccgc gcacgctacg ccgcactgcc 53880  
 catctctac ggcacggccc agcgcgtgct cttcagccgc gcccggtgc gtcccggcga 53940  
 gagcgtgctg ctgttcggcg cgaccggcgg cgctcggcgc gcctgcgccc agctcgcct 54000  
 gcgtgcggg gcccgatca tcgctgtc cggatcaccc gccaaagctc cccggctgcg 54060  
 ccgactcggc gtgatcgaca cgatcgacac cggcaccgag gacgtacggc gcagggtccg 54120  
 cgaactcacg gacggcggtg ccgacctggt cgctcgactac cagggaagg acacctggc 54180  
 cgtctccctg cgctcggcgc gcgcggcgg ccgcacgtc acctgcggcg cgaccaccgg 54240  
 gtacgaggcg acgaccgacc tgcgtacgt gtggtcggt cagctggaca tctcggctc 54300  
 caacgcgtg caccgcgacg atctgcacac gctggtcgac ctggtggcca ccgacgccct 54360  
 ggaaccggtg gtgcacgcg acttccact ctcccgccc cccgaggcgg tcgccgaact 54420  
 ggaggagcgc cgggcgttcg ggaaggctgt gatccgcacg gcgtgaactc actcatgtcc 54480  
 cggctcgatc ccagggggaa acagcgtgac cggcaacacc acatccgccg cttcctcgcg 54540  
 gcggacacag aacgcgtcgc ccacgcagc caagatatgc gccagcccg aggagaccgc 54600  
 ggagcgcgtg ttctccgaca tctctcgggt gtcacgagac accggcttcg gccgcgaaca 54660  
 cggcctcgcc ggggtccgca cccgccagga gtggcggcgt gccgtgccca tccgcaccta 54720

cgacgaactg gccccctacg tgcagcggca gttctccggc gaacgccgcg tgctcaccac 54780  
 cgacgacccc cgcgcccttc tgcgcacctc gggatcgacc ggccgcgcga agctggtacc 54840  
 caccaccgat cactggcgcc gtgtctaccg cggaccggcg ctgtacgcgc agtgggggct 54900  
 ctacttcgaa cagatcggca cgcacgggt caccggcgac gaggtcctcg acctgtcctg 54960  
 ggagcccggc cccatccggc accgactgcg cggcttcccc gtctacagca tcaccgagcg 55020  
 ccccggtgctg gacgaccccc acgactggaa cccgcogtgg cgtcacgcga ggtgggtcac 55080  
 ccgcgatgcc ggtgccgcga ccatggccga cctgctctac ggcaaactgc tgcggctggc 55140  
 cgcccacgac ctgagactga tegtctcggt gaacccctcc aagatcgtcc tgctcgccga 55200  
 gacactgaag gagaacgccg aacgcctgat ccaggacctg cacgacggcc acggcacgga 55260  
 ccgggcagcc cgcccggact tcctccggcg cctcaccgcc gccttcgacc gcaccggagg 55320  
 ccgtccgctg ctcaccgacc tgtggcccgg cctgcgtctg ctgctctgct ggaactccgc 55380  
 ctccgcgggc ctgtacgggc cctggctgtc ccggctcgcg accggcgtgg cggcactgcc 55440  
 gttcagcacc acgggcaccg agggaatcgt cacgctgccc gtcgacgacc acctctcggc 55500  
 ggggcccgtc gctgtcgacc aggggcattt cgaattcgtt ccgtggcagg acctggacga 55560  
 cggcagccct ctgcccaggg acacccccac cctcggtat gacgaactcg aactcggcgc 55620  
 cgactaccgg ctgctcatga gccaggccaa cgggctctac cgctacgacg tgggcgacgt 55680  
 gtaccgcgtc gtcggagcgg tggcgccac gccacggctg gagtttctgg gacgcgcggg 55740  
 attccagtcc tccttcaccg gcgagaagct caccgaatcc gatgtgcaca ccgccgtgat 55800  
 gcgggtcctc ggcagcgaac gcaccgacca cccgcacttc tccggcatcc cggctctggga 55860  
 caccgccccc cactacctcg tcgccatcga atgggctgac gccacggca cgttgaacgt 55920  
 gcaggacaca gcccgccgca tcgacgcgac tctccaggaa gtcaacgtgg aatacgccga 55980  
 caagcgcgc agcggacgac tgcggccct gcagatcctg cccctggtgc ccggcgcttt 56040  
 cggccagatc gccgaacgaa ggttccgcca gggcaccgcg ggagcccaga tcaaacacca 56100  
 ctggctgcag aaggactcgg cgttcctcga cacgctgcgc gacctcgacc tcgtccgcgc 56160  
 ccgcccgggg acgtgacggc atgcgcctcg gattcgccgc acccatgtcc ggcccctggg 56220  
 ccaccccgga caccgcctg cacgtcgccc gcaccgccga acagctcgga tacgcctcgc 56280  
 tctggacctc ccagcgagtc ctggcgcgcc ccgacgactc ctggggcgag gccaacgcga 56340  
 gcgtccacga cccctgacc accttggcct tcctggccgc gcacaccacc gggatccggc 56400  
 tcggtgtcgc cgttctgatc atgccgtgc acaccccgcc ggtgctggcc aagcagctca 56460  
 ccacccctga cctgctctcc ggcgcccgac tcgacgtggg cctcggcaac ggctgggccc 56520  
 ccgaggagta cgccgccgcc ggcgtagccc ccaccgggct cagccgcgcg gccgaggact 56580  
 tcctcgctg tctgcgggcc ctgtggggtg agcagaccgt ggtggaacac gacggcccct 56640

tctaccgggt cccgcccgc cgttcgacc cgaagccgc ccagtccccg caccgcgcgc 56700  
tgctcctggg cggcgccgcg cccggcgac tgccgcgcgc cggccgcctg tgcgacggct 56760  
ggatcgcgag cagcaaggcc ggcccggccg ccatccgcga cgccatcacc gtcgtacgcg 56820  
acagcgctga gcgaaccgga cgcgacccccg cgaccctgag gttcgtctgc cgcgccccgg 56880  
tccggctgcg gaccgggtcg gcccccaacg agccgcgcct gaccggcacc gcggagacga 56940  
tccgggccga tctcgccgcg ctagccgaca ctggcctgac cgagatcttc ctggacccca 57000  
acttcgaccc cgagatcggc tcaccggacg cgcgcaccgg cgacgtgcga caccgcgttg 57060  
atctgctgct gcacgaactg gccccgcaa actggtgaga ggaagagaac agtgctgac 57120  
gcgcgcgcgc cgtcgggaga agaccgaacg tacgcccgcg tcgacacgga cacagggtcg 57180  
atccacctcc tggccggcac tccctacgac gagatccggc cgaccggcga aaccagaccg 57240  
cttgccgagg ccgcctgct cgcaccggtc gaaccagca aagtgtggt cgcaggacgc 57300  
aattacggcg atgtcgtcac accggacctg gtggtcttca tgaagccgtc cacctctgtc 57360  
gtcgccccca ggagcacctg cctgctgccg gcggaggcca agcagggtccg gtacgaggga 57420  
gaactcgccg tgggtgatcg gcgccgtgc aaagacgtcc ccgaagacac cgcggaccag 57480  
gcgtgttcg gctacacctg cgccaacgac gtcaccgcct gggacgtcg ggaaccgaag 57540  
ggccactgga ccaaggcgaa gagcttcgac acattctgcc cgctgggacc atggatccgc 57600  
accgatctcg accccgctga cctcgctctg cgcacaaccg tgaacggcac gctgcgccag 57660  
gacggctcca ccaaggaaat gaacaggaat gtccgcgccc tcgtgtcccg ttgcagctca 57720  
ctgatgacgc tgcgtcccgg agacgtgatc ctcaccggca caccggcggg cgccggcgtg 57780  
ctgcgtccgg gtgacgaggt cgtcgtcgag attgacggga tcggttcgct cgcgaatccg 57840  
atcggcgtgg ccaagtagtt cactgactac actcgcgca acaacacggg cccgtctgcg 57900  
gcgcttcgag ctgcgccgat ccccgaggag agattccagt gtctgtaatc cgtcccaccg 57960  
ccgaaaccga acgcgcagtc gtggtggtcc cggctgggac gacgtgcgcc gacgcggctca 58020  
ccgcggcaaa gctgccgcgc aatggcccca acgcgatcgt cgtggtgcga gaccggtccg 58080  
gcgccctgcg tgacctcgac tggacccccg attccgacgt cgaggtcgag gccgtcgcgt 58140  
tgtccagcga ggacggcctc acggtgctgc gccactccac ggcacacgta ctggcccagg 58200  
cgggtccagca actctggccg gaggccaggc tcggtatcgg cccgccgatc gagaacggct 58260  
tctactacga cttcgacgtg gagcgccctc tcagccaga ggacctcgag cgcgtcgagc 58320  
agcggatgaa ggagatcatc aagtccggcc agcgcttctg ccgccgcgag ttccccgatc 58380  
gggaagcggc ccgtgccgag cttgccaaag agccgtacaa gtcgagctc gttgacctca 58440  
agggcgacgt ggacgcgcgc gaggcaatgg aggtcggcg gagcgacctg acgatctacg 58500  
acaacctcga cgcgagaact ggagatgtgt gctggtccga cctctgccgc ggccccact 58560

tgccgtcgac ccgcctgac ccggcgttca agctgctgcg caacgcggca gcctactggc 58620  
 gcggcagcga gaagaacccc caactgcagc gcatctacgg cacggcctgg ccgaccgcg 58680  
 acgagctcaa gtcccatctc gccgccttgg aggaggccgc caagcgtgac caccgccgca 58740  
 tcggcgagga actcgacctc ttccggttca acaaggagat cggccgcggc ctgccgtgt 58800  
 ggctgcccga cggcgcgac atccgcgacg aactcgagga ctgggcccgc aagaccgaac 58860  
 gcaagctcgg ctacaagcgc gtcgtcacc cgcacatcac ccaggaggac ctttactacc 58920  
 tctcaggcca tctgccttac tacgcggagg acctgtacgc gccgatcgac atcgacggcg 58980  
 agaagtacta tctcaagccg atgaactgcc cgcaccacca catggtgtac aaggcgcgcc 59040  
 cgcacagcta tcgcgacctg ccctacaagg tcgccgaata cggcacggtg taccgattcg 59100  
 agcgcagcgg tcagctgcac ggcatgatgc gtacgcgcgg tttcagccag aatgacgcgc 59160  
 acatctactg cacggcggac caggccaagg accagttcct ggaagtcatt cgcattgcacg 59220  
 cggactacta ccgcactctg gggatcagcg acttctacat ggtgctcgcg ctgcgtgact 59280  
 cggcgaacaa ggacaagtac cacgacgacg agcagatgtg ggaggacgct gagcggatca 59340  
 cccgggaggc catggaagag tccgacatcc ctttcagat cgacctgggc ggtgccgcgc 59400  
 actacggccc gaaggtcgac ttcattgatcc gagccgtcac cggcaaggag ttgcgcgcct 59460  
 ccaccaacca ggtcgacctg tacacccgc agcgtttcgg gctgacctac cagactccg 59520  
 acggcaccga gaagcccgtc gtggtgatcc atcgcgctcc gctcggctcg cagcagcgtc 59580  
 tcaccgccta tctcaccgag cacttcgcag gtgccttccc ggtgtggttg gcgccggagc 59640  
 aggtccggat cattccgac gtggaggaa tcacggacta cgcagaggaa gtccgcgaca 59700  
 tgctgctgga cgcggacgtg cgtgccgacg tcgatgccgg cgacggccgg ctgaatgcca 59760  
 aggtacgcgc ggccgtcacc cgggaagatcc cgctcgtcgt ggtggtcggc aggcgagagg 59820  
 ctgagcagcg caccgtaacc gtgcgcgacc gctccggcga ggagaccccg atgtccctgg 59880  
 agaagtctgt ggcccatgtc actggactca tcaggaccaa gagcctggac ggcgccggcc 59940  
 acatccgtcc gctgtccaag gcctgaccca cagccacggg gcccggcag gtgtcccgcc 60000  
 tcggaccacc cccttcggtc ctacgcgac ggcggggtca tggcagccgc ccgacctgcc 60060  
 ggtgccgtgg ctgttcggca acccgtgggc gccgcccgcc gaggagaccg cgcgctgccg 60120  
 ggggatgac tcgtccggcc cgcgccccgg gtcaccggg cggcgctgga gcgggcccga 60180  
 cgggagccgg gaccggccga ccgtccgtgg tcggtctcgt cccggacgag cagggacagc 60240  
 agtgccggca cggtgaggcc cgcttccgcc ggggtggcga ggacctgtc cggttcgacg 60300  
 cggtagatgt tgctgcgccc gtcacgggtg tgggagagat agccgtcctg ctccaggtcc 60360  
 gagatgatcc gctggacggc gcgctcgggt agtctgcagt gggcgcgat gtcgcggatc 60420  
 cgcacgttcg gattgtcggc gatggccgcc agtacacgcg cgtggttggg gacgaacgtc 60480



catccggagt gagattcagg cactgcaacc atgcacagca ttgtaggac catctttgcc 60540  
ggacagccaa tacatgacat acttttcgcg ttaagagtgg catgttctgt cccatgggca 60600  
actgagaagg gacccgaggg tgtctttgga tgaagcggtc gcggggtgct cgcgccacac 60660  
cggccggcgt cggtcccgg ccgcggagca acccacgcag gcgcagtacg aagcgcacgg 60720  
cgctgggtc gtcagcgcac ggggcgcata cgacatgaac tcggtcgagc cttggccga 60780  
cgcgttga aa gacgcggccg agaagtctcc gaaggtggta ctggacgcct ccggcatcac 60840  
cttcgccgac tccaccctgc tgagtctgct gatcctcacc caccaggcga cggacttccg 60900  
ggtggccgcg ccgacgtggc aagtgatgcg gctcatgcaa ctgacgggcg tcgacgcctt 60960  
cttgaaggta cgggccacgg tggaaaggc cgcaccgct taggggcacg gcgtgccggg 61020  
cctcggtga cgcaagccga tggcttgag ctgagaattc cgggcattcg acgttctgcc 61080  
tgcccccg cgtcgatgg tggccggcca ggcgtgatga agacagtcac ctccctcgagg 61140  
cgcgatcgac cgcgcctcgg gggagggcgg ttgacgggag agggaggtg tccatgattc 61200  
tgccggcgga gaaggaaactg cgtgccgtgc tggctcggtt cgctcaggcg cgcacgacc 61260  
acgacgtacg tcccagcggc tgcaccagca ggctcctcga ggacgccacg tacaccctgt 61320  
gcgtgatgac cggtgcccgt accgccgaac aggtctctcg tacggcggac gaacttctcg 61380  
cacagtctgc cgagcgcacc gctgccccg tggaggacga agcctggcc gcgtgagccg 61440  
acggcacaca cctgcggcgc ctgcgtggc aggtgtgtgc ctgcggcgg gcggacgcga 61500  
gcacctgagg aatgagaga gagtcatgag cgatacccg cttcggcagc gcgatgagac 61560  
gtcgaagggg ccggccaccg agatcccgcc gccgcagtgg cgggacctct tcctcgcccc 61620  
cgactggggc ggcaactgat agcaggtgat cgtcgccgaa gaggcgcgcg ggcccgagca 61680  
cttcaccgga gcgcgccgtc cgcgcggcgg ccgcgatcg agtcgacggg ccgcgtgatg 61740  
cgcggccctg ccgcgacggc cgcaggtcag gtgagggcga tccgtgcggt gatgcgctt 61800  
ccggacggct cgggccggat ctgcacggcc tggtcagcg ccgccacgat ctccagaccg 61860  
tgctgacca cccgggcccgg atcgccgggc cggggagcgg gcagggtggg gtcaccgtct 61920  
cgcacggtga cagtcaccgc gtcgtccgtg aggtcaggg tgagttctat ggggtcggcc 61980  
ccgtacttga ccgcgttcgt gatcagctcg ctaccacca ggtggacggc ctccgacgct 62040  
ctctccggca ccggcgaccg aaggtcccgc tgtgaacggg tgaggtagtc ggtcgcaag 62100  
tgacgggct cggcgatccg cagcgcttcc cgccggtacg tcaccaggc cggccgcgga 62160  
tccgcacct ccggtgccg ctgtgtcgac gaaccgtcca gtccggtct acccatgtca 62220  
accgccacgt taccctcgag ccacgcacgc gcgccgacgc ctccgcgcg atgagaacat 62280  
ctcatgtgtt cctacgatag ttctgcttcc cgtcggtcac cgcaccgctc ggccagggag 62340  
aaagcgggg cctggacgtg atccgggcct caggccgtgc tgagcacgcc tccgcgcaag 62400

cgggccgggca gccgctccgg aatccgtgcg gtcgtcgteg ccatgatgtc cctccccgtt 62460  
 ccgatggccc gctcgcggtga cgggccactc ggcggtacc ccctgcgcgg gctcgcatgc 62520  
 acggaggcgg agatcttgte cgaggccgtt ccgctcccgc ccgcgcgacg tgatcaggtc 62580  
 ggcggttacg ggatcaggaa ttccagcacg ggctcggtccc aggccaccgc gggcggggttc 62640  
 gcgcgggcg gttccggtggg cagggcgccc acagcgcggt agaagccctc ggccggaggg 62700  
 tgcgacacca cccggacacg gtccagccct gccgcgcggg cccgcctctt catgtgatcg 62760  
 acaagcagcc gtccgatgcc gcggccctgg gtaccgtcct ggacgaacag cagggtccagc 62820  
 tccgcggcg cgaggagcag cgcgtagaag ccgagcacc ccgtccgtggc gtcctcggcg 62880  
 tcgacgctac gaagacctgg tggttctcga tgtagtcggg cccgacgcgg tagtcggaga 62940  
 ccacgcgcgc gtacggggccc tcgtaggctc gtgagccgcg tacgagacgc gagagccgct 63000  
 tggcgctccc ggcgaccgcc cggcggtatga cgatctcgcc ccgtacggac gcggaactcg 63060  
 attgcacggg gagcagtcta cgcgtccggg acggggcggg acctccgcgg gctccgtccg 63120  
 agccttccgt cagtccgtcc cgatgaegac cacctcagtc cgtcccgatg acgaccacct 63180  
 cgtcctcggc cgtccaccgg cgcgcctcgc gtttgggagg attgatccgc actccgtagt 63240  
 gggggcgcggt cgacgcgtcg gcgtggtcgc ggtaaccgat ggcgcaactcg ccgcgacggc 63300  
 gtgccgcggc cagcagcgtg gcgaaggacg tgggtgctcc tggcaacagg tagtcggtcg 63360  
 ccggccgcag gcggaccccc gcgccctcgg cggagaacag ttctctgaag accgcggcca 63420  
 ggtgccgggt ctgggagatc tgggacatga gcaggccgat gagcttgccg ctgatgatga 63480  
 cgtcggcccc ggggccgatg gggggccagc cccggttgcg gtcgtcgatc agttcgggtga 63540  
 cgaccggcag ctcgcgcccc gtggcttctt ccagttggcg caggagcaga agggtgacga 63600  
 gcgtgcgggt gtcgggatcg tccggcggtt ggcccggggc ggggtccgc cccagcacga 63660  
 tcacgctgtc gtaggagtgg acgtccaggc gccgcagcgt ctcgggacgg gtgatgtccc 63720  
 cgtggtgcag agccaggctc aggccgttcc caccgttctc cccgtttccg ctgtccgctt 63780  
 cggcctcgct gatctcgcg atcgtcgct cggccgggtc cgccacgacg tcgacggccg 63840  
 aaccgggccc ggcgcgtcgg tgcaactggt cgaccacgag cggcgctcgg cggttccagc 63900  
 ccagtagcag aatccgctcc gccggcgcg gcgtcggagg gcgggaggcc accgcggcct 63960  
 tctcgaccga ctccgcacag tcgtccagcc gggccgtgtc gtcgtcgccg gtgatgacga 64020  
 cgagcaggte gtccggggcg accggcgctc tcggcgggcg gttgagcaag ggggtgcagc 64080  
 cgcgcacatc tccgacgacg ctcgtcgtcg agtaggacag gagaacctcg ccgaacgggc 64140  
 ggccggtcag ggccggctcg ctgatcagat agaactcgtc tccggcgaag tcgaggagtt 64200  
 cccggtggac gaggagatc ccggggcggc gggcgccctg gacgatcagc cgggcgggtga 64260  
 cgggtgtaact ctccaggacg acgccgtcgg gtccggcggc gagacaggcg gccaggcggt 64320

accggtcgtc ccggacggcg gcgacgacgg gcggacgcgg ttctgccccg gccagagcgg 64380  
 cccgcagcgc cagcagtgtc ttcaccacct ccgcgtcggc gtgcgggtcg tccggaggca 64440  
 gaaccagcac gacaccggcc gtggccgggc tggtaacgg caacacggcc gggtcggtgg 64500  
 tggggccgct gcggcagatc aaccgcgtac cgccgcagga gccaccttc gtgcccaggg 64560  
 actcctccat gacggtcttg tcccggtcgg ccagcaccac caccgcgcg ccgcgttgg 64620  
 tgacgttggc ggccaccagc tcgctacca ccgtgaagac ctgttccgac catccgagga 64680  
 ccacggcgtg cccctgttcc agcacggtgg aacggccccg ccgcaacgag gtgagccgct 64740  
 ccgtgagcgc cgtcgtgatc aggccgacga gcgtggagac gtagagcagg gtgaccagcg 64800  
 cgagcagcac cgacaacatc gccgcgagcg gcgtaccgtt ggcaccgccc agccgtagcg 64860  
 tctccccggt gagacgccac acctccgcca gccgtccgc gagggacggc ggggcatccg 64920  
 ggtcgggtcca caccatcacc gcgctggccg gcacgacgac ggccaggga agcagcgcca 64980  
 tccagccgac gagcgcggcg gcaccgcggg ccagggtgct gtcgaaccag taacgggccc 65040  
 tgtcacgaa cggagtccgc cgtcgcgca cccgtcccc ttccgtctcc ccgtactccc 65100  
 accaggccgc gtccggaccg cagcggcgcc gtgccgcgcg ggctgcccc ggagcgcgga 65160  
 cgtgggcacg catgtcgcag tgtgggggat cgatcagggc cgcagacgac gttcgaccag 65220  
 ccttcattccc ttccggtagc ccgctcctcc acggcggcgg acctgcgaag acgcccggct 65280  
 cggacacgca gatgaaagcc gccgggcctc attcgcggaa cgccgggtat ccgcgagacc 65340  
 ggatcaccgt cacacacagc gaggagagac cctgtgccgt ccaccgatgt cgtcgaactc 65400  
 atcctgcggg accaccgccg tatggaggaa ctgttccgca ccctgcgcaa cgtcgaagcg 65460  
 gaccgtgccg cggccctgac ggagttcgcg gacctgtca tcgcgcacgc ctcggccgag 65520  
 gaggacgagg tctacccgc cctgcgtcgg tacaagaacg tcgagggtga ggatgtcgac 65580  
 cacagcgtcc acgagacca cgaggccaac gaggcgctgc tggccctgct cgagggtggag 65640  
 gacaccgctt ccgacgagtg ggatgacaag ctcgaagagc tggtcacggc ggtcaaccac 65700  
 cacgccgacg aggaggaacg aacactcctc aacgacgcc gggagaacgt cgccgacgac 65760  
 cgccgcggg aactggggca gaagttccag gaggcgcgtt cgcggtatct ggagaccggc 65820  
 tgcggcagtg tcgagaacgt gcgcaagctg gtcgccgccg ccgacgactg acccgcgtcg 65880  
 gcgacgtccg ggcgcggagg ggagccgccg ccgtcgggcc ccctgcgcgg gcgtaccgcg 65940  
 gtcaggcggg tgagggtgc gtccgggtccg ggacgggttc gaggcggacg acgatgccct 66000  
 tggacgtggg ctgattgctg atgtccgca cgctgtccag cggtaaccag acgttggtct 66060  
 cgggatagta ggcggcggcc gagcccttg ccgcgggta gggaacgacc tggaaattct 66120  
 cggccccggc ctcggtgccg tccgccaga cgctcagag gtcgacgca tcgccctggg 66180  
 cgaggccgag ttcgctcagg tcggccgggt tgacgaggac gacgtggcgg ctgccgtgga 66240

tgccgcggta gcgatcggtg tcggtgtagg ggacgggtgt ccactgggtcg tgcgaacgca 66300  
 gtgtctgcag cagcagatga ccttcgggcg cccgtgggac cacgctctcg ttgcgagtga 66360  
 acagggcctt gccgacctcg gtgttgaaga cgccttcgtt gaccgggttg ggcagttgga 66420  
 agccaccggg cggggtcacg cgtgcgttga agtcgtggaa gccgggcacg atgcgcgcga 66480  
 tgccgtcgcg gatgggtgtg tagtcgcctt cgaaggcttc ccaggggatc tccaccctgc 66540  
 cgtccagggt gagccgggcg agccggcaca ggatcgcgat ctgctcagc agcatggggg 66600  
 aggcgggggc caggcggccc cgggaggtgt gcacctcgct catggagttc tcgacgggtga 66660  
 cgaactgctc gccgtcggcc tggacgtcgc gtcgggtgcg tcccagcgtc ggcaggatca 66720  
 acgcgggtgt accgcagacg gtgtgcgagc ggttgagctt ggtcgagatg tgggcgggtca 66780  
 gccggcacga gcgcatcgcc tcctcgggtga cctcgtgtgc gggcgccgcc cggacgaagt 66840  
 tcccggccag ggcgaggaag accttgacgc ggccctcgcg cattgccttg atcgagttca 66900  
 ccgagtcacg gccgtgggccc cgcggcggct cgaagccgaa ctgctccgc agggcggtcca 66960  
 ggaagggtgt cggcatctgc tcccagatgc ccatgggtgcg gtcgccctgg acgttgctgt 67020  
 ggccgcgcac cgggcaggcg ccggtgccgg cgcgtccag gttgccgcgg agcatcagga 67080  
 agttgacgat ctcccgacg gtgggcacgc cgtgcttgtg ctgggtgatg cccatcgccc 67140  
 agcagacgac gacgcgttcg ctgtcgagga cctcgtcgcg taccttctcg atctcctgc 67200  
 gggtcagtcc ggtcgccgcg cgcacgtcgt ccagtcac cgtcggggcg tgccgggcca 67260  
 actcctcgaa gccgggtggtg tgggcgtcga tgaagtcgtg gtccaggacg gtgccgggcc 67320  
 gggcgctctc ggctccagc agcagtcggt tgagggcctg gaagaggcg aggtcgccac 67380  
 cgggcttgat gtgcaggaaa cggtcggcga tccgggtgcc gcgcccgcg accccgcgcg 67440  
 gctgctgcgg gttcttgaag cgtcgcagcc cggcctcggg aagcgggttc acggccacga 67500  
 tccgggcgcc gttccgcttg gcctcctcca gcgcgtgag ctggcgcggg tggttgctgc 67560  
 cggggttctg cccgaccagg aagatcagat cggcgtggtg gaggtcgtcg agaccgacg 67620  
 tgcccttgcc ggtcccagc gtctcgctca gggcgaagcc gctggactcg tggcacatgt 67680  
 tgctgcagtc gggcagggtg ttggtgccga aggcgcgggc gaagagctgc agcacgaagg 67740  
 cggcctcgtt gctggcgcg cccgaggtgt agaaccgc ctcgtcgggg gaggccagcg 67800  
 acttgagctc ctccgcgagg acccccaggg cgtcgttcca gccgatgggc tcgtagtgcg 67860  
 cggagccggg ccgtttgatc atcggtcgg tgagccggcc ctgctggttg agccacatgt 67920  
 cggagcggcc ggcgaggtcg gcgacgtgt gtcgcggaa gaagtcggcg gtcaccgcgc 67980  
 gtgtggtcgc ctcgctgctg atgtgcttgg cgcggttctc gcagtactcg ttgcgggtggc 68040  
 gccgtcccgg ggcgggtcc gccacgcgc agccggggca gtcgatgccg cccacctggt 68100  
 tcatggtcag cagatccacc ccggtcctgc gcggggacgt ctgctccaag gagtactcca 68160

gcgcgtgcac gaccgcgggg acgccggcgg ccacttctt cggcgggtgtc acggagagggc 68220  
 tgggtctccga ctctcaccg tgcggcttct gcatgtgttc gcctttctct cgccgtgtcc 68280  
 ggccctcggg cagccgacgg gccaccgggc caccctgtct ctggggcgggt ccggtcgac 68340  
 gtgttgcaac cgcccggttg ggatgggtgc gcgccaggcg ccgccctctt gtcccagtc 68400  
 ctccatgaac cgtttgaatc tcgtcagctc gccgtggacc agtcgggtgg tcagccggac 68460  
 cgcccgcgag gaacgggtga ggatcctcgc ggctccccgc ggttcagaa gcacccggac 68520  
 ggtgatcgcg gtgccgccgg actccgtcgg cctgaactcg acctctccc ggtgccacgg 68580  
 cctctgtctc aggccgcgcc aggccaggta ggctcgggg tcctgtcca ggatctcgac 68640  
 cgcgaagcgg cgccgcaggg ggccgtaacc gaggggtccag gcggtcacgg tgggccggac 68700  
 ctgctcgacg tcgcggacca cggccgagaa ccgaggaag gacttgaact gcgtccactg 68760  
 gttgtacgcc gtccgtacgg gcaccgccac ctgcaccgtc tggtcgacgt gccgtcgcg 68820  
 cagcggacga cgccccgtgc tcctgtcacc gctgggtgcgc gcccccggtg tgtccggcac 68880  
 ggcccgcggg ccctcgtgct gctccgccat cgtggtctct cctcctgtgg ggggaaccag 68940  
 gcgtccaggc tctcgacgtc tcctcgtcgc tcagggtccc ctctgtcgtc agggttttcc 69000  
 cctcccggtt ccacactccg gcgtttcgag tcacctcggg ccgcgcggt cctcgtgcgc 69060  
 gtcggcctcc gacgccccgc ccggagagat ccggctcgac gtcggcctgg tcgctccggc 69120  
 gggcgggtgag cagcaggtag tcccagtcga tggccccgtc ccgcagcgcg ccggccgcga 69180  
 ggtcgggtgag ggccgcgtcc agggcgggcg cgcgtcggg gtcgtcgccg atgtaccggg 69240  
 agacggcgat gatcgcccc taggcggcct tgaagaactc aaggaagtcc ccccttcgag 69300  
 cggcgtcgg gaccgggggt gcgccggccg gcctgatgac cagcgtcgac ggggtcgtga 69360  
 gagcgtgatc gaggtgctcg acgagccgga gccaccgcag gagagtcgcg ggcagcgtc 69420  
 tctccagcaa ccagccttc gcacaccctg gcgcggcgca aggggcgtac gtcccctgcg 69480  
 caaagggcg gctggaggcc ggtgccccac gcctcgtctc cgcacggcgc gtcggacggg 69540  
 gggagaacgc gtccgatgaa cacgggtgtgc gccctcccga ttctctccg tgacgtcaat 69600  
 gatgagccca ccgcgcctgg gtcaggcgat ccgcgggtccc ctgccgtcg gtcagggggc 69660  
 ggtgacggaa ggagtccacg gtgttgcttc tcctctctcc ggacgggtgc gaggaagccc 69720  
 tcgactgcgc gaaggcggcg gagcacctcg acatcgtcga cgtgaagaag cccgacgagg 69780  
 gctcgtggg cgcgaacttc ccgtgggtca tcaggagat ccgcgacgcg gtgccggcgg 69840  
 acaagccggg ctcggccacc gtgggggacg tcccgtaaa gcccggcacg gtggcgacgg 69900  
 ccgcgtggg cgcggtcgtc tcgggggcca cgtacatcaa ggtcggcctc tacggatgca 69960  
 cgacgcccga acagggcatc gcggtcatgc gcgcgggtgg ccgggcgggtg aaggaccacc 70020  
 gtcccgaaac gctcgtcgtc gcgtccgggt acgccgacgc ccaccggatc ggctgcgtca 70080

acccgctcgc cctgcccgaac atcgccgccc gctccggcgc cgacgccgcg atgctcgaca 70140  
 ccgcgggtcaa ggacgggacg cggctgttcg atcacgttcc gccggacacc tgcgccgagt 70200  
 tcgtccgtcg cgcacacgcc gccggcctgc tcgccgccct cgccgggcagc gtcaggcaga 70260  
 ccgacctcgg ccggctgacc cggatcggca cggacatcgt cggggtgccg ggagcggctt 70320  
 gcgagggcgg cgaccgcaac gccggacgca tccggccgca cctggtggcc gccttcggga 70380  
 gcgagatgga ccggcacgcc cgcgagcacc gggccggcgt caccaccgcg agctgaccgc 70440  
 cggtatgccg acccccgcac ccgaccacgc ccccgcacag cgggccgcgc ctctcgcggg 70500  
 cgtcgatccg gccaccggaa cggctcttca cgaggcccc gaccaggac cggacgtgct 70560  
 ggacgccgtc gtcgaccggg ccgcgccggc ctggcacggc tggcgcgccg atcccgaacg 70620  
 ccgtaccacc gcgctgcgct cggcgccgga cgcggtcgag gccgccgggg acgacctcgc 70680  
 ccgtctcctc acccgggaac agggaaagcc cctggccgaa tcgcatgcgg aggtcgcccc 70740  
 gacggcggcc cgcctgcgct acttcgccg cctggccccc cggaccgggc gcatcaccga 70800  
 cggggcggccg gtgcgcagcg aggtccgctg gcgccccctc ggaccgcgtc ccgcgatcgt 70860  
 gccgtggaac ttccccctcc aactcgcgtc ggcgaagtcc gcgccgcgcg tcgccgcggg 70920  
 caacaccatg gtccctcaaac cctccccctt caccgcgtc gccaccgggc tgcctgggtc 70980  
 cgtcctcgc accgccctgc ccgaggacgt cctgacggtc gtcaccggcc gcgagccact 71040  
 cggcgccccc ctcgccgcac accccggcat ccgccacgtc accttcaccg gatcggtgcc 71100  
 cacgggcggg gccgtgcgcc gagcggcggc ggcctcgtc gcccggtca ccctggaact 71160  
 gggcggaac gacgccgcg tctgtctgga cgacgtcgaa gtggaccgga tcgccgaccg 71220  
 gctgttctgg gccgcgttcc gcaactgcgg gcaggtctgc atggcggtca agcgcgtcta 71280  
 cgcaccggcc cgtctgcacg cacaggctgt cgaagccctc accgagcgcg ccaaggccgt 71340  
 cgccgtcggg ccgggcctcg acccccgcac ccggctggga ccggtcgcca acgccccca 71400  
 gctggccccg gtcgagcaga tcaccggcg cgccctggcg gacggcgccc gggcggcggc 71460  
 cggcggccac cggctggacg ggccgggctg cttcttcgcc ccacgatcc tcaccgacgt 71520  
 cccgcccgaac agcccgggtg tgaccgagga gcagttcggg ccggtactgc cggtgctgcc 71580  
 gtaccggagc ctggacgaag ccgtcgacgc ggccaacggc acgggattcg ggctgggggg 71640  
 ctccgtatgg ggcaccgacc tcgaccgggc cgaggcgggtg gccgaccggc tggaatgcgg 71700  
 cacggcctgg gtcaaccacc acgccgagct gtccctcgc cagcccttcg ccggcgacaa 71760  
 ggacagcggg gtcggcgtcg cgggcgggccc gtggggactg tacggcaacc tccgtccgtt 71820  
 cgtcgtccac cgaccgcggg gggagtgacg gtgagcttcc gggcggccgt actgcgcggg 71880  
 tacgaggacc ccttcacggt cgaggagggtg accctgggga cggagcccg cgaggggag 71940  
 atcctggtcg agatcgccg ctgcggaatg tgccggaccg atctcgcggg ccggcgctcg 72000

gccggccgga gcccgctgcc ggcggtgctc ggccacgagg gctccgggggt ggtggtgcgg 72060  
 acgggcgggcg gcccgacac cgcgatcggc gtcggtgacc acgtggtgct gagcttcgac 72120  
 tcctgcgggc actgcgcaa ctgccgcgcg gcggcccccgc cctactgtga ttccttcgcc 72180  
 tccctcaacc tcttcggggg ccgtgcggag gaccgcgcgc ggctcaccga cgggtcgggg 72240  
 gcggcactgg ctccccggtg gttcggacag tccgccttcg ccgagtacgc gctcgtctcc 72300  
 gcccgcaacg ccgttcgggt cgaccccgcc ctgcccgtcg aactgctcgg gccgctgggc 72360  
 tgccgcttcc tcaccggagc cggagccgtg ctcaacacct tcgccgccgg gccgggcgac 72420  
 accctcgtcg tgctcggcgc gggcgccgtg ggctggccg cggatgatgg gccaccgcc 72480  
 gccggcgcac cgtccgtggc cgtggaccgc aacccccgtc gcctggagct ggccgagcgg 72540  
 ttccggcgcg tcccgtgcc cgccgcgacg gccggactgg ccgagcggat ccggcggtc 72600  
 acggacggcg gcgcgcggta cgcactggac acgaccgcct ccgtcccact gatcaacgag 72660  
 gcgctgcgcg cactgcgtcc caccggcgct ctgggccttg tggcacggct ccacaccgcg 72720  
 ctgcccctgg aaccgggcac gctcgaccgg gggcgagca tccgccacgt ctgcgagggg 72780  
 gacgcggtac ccggtctget gataccgcag ctgaccggc tctggcaggc cggacgcttc 72840  
 cccttcgacc agctcgtccg tacctacccg ctggccgaca tcaacgaggc ggagcgcgac 72900  
 tgcgacgcgc gcctcgtggt caaacccgtg ctgctccgc ccgcgaggag ccggtgagta 72960  
 cggcgcacgg caccgcggtc cgaccgcac cgacgagcag gaagctcgcg gcccacttc 73020  
 cgccaacgga ggagacatga ccggcacggc gccgcagtac acggacgtgg aaggcgtgaa 73080  
 cggaggtgtg ggcctgacgg ccttcctggt cgccgcgcgc cgggcgatcg agaccatcg 73140  
 cgaacgacgt ctggcccagg acgtctacgc ggaacacttc gtgcgcgcgc ccccggcgtg 73200  
 cgcggactgg ccggtgcgca tcgagcaggt ccccgacggg gacggcaacc cgctgtgggg 73260  
 acggttcgcc cgctatttcg gcctgcggac ccgggcccctc gacgacttc tgctccggtc 73320  
 ggtccggacg ggccccgcac aggtggtgct gctgggcgcg gggttggaca cccgtgcctt 73380  
 ccggtcgcac tggccgtcgc agtgccgggt cttcgagatc gaccggacgg gcgtgctcgc 73440  
 cttcaaacag caggtgctca cggacctggc ggcaaccccg agagtggagc gcgtccccgt 73500  
 tccggtcgat ctgcgcgcgg actgggcccgc cgcgctgacc gcggccggct tcgacccgc 73560  
 ggcgcccagc gtctggctgg ccgagggact gctcttctat ctgccgggcc ccgccgagtc 73620  
 gcttctcgtc gacacggtgg accggctgac caccgacggc agcgcgctgg ccttcgaggc 73680  
 caagctggag aaggacctgc tggcgtaccg cgacagtgcg atctacacgg cgacgcgcga 73740  
 gcagatcggc atcgacctcc tccgcctctt cgacaagggg ccccgacccg actccgcggg 73800  
 tgagctggcg gccagaggct ggtccacctc gatgcacacg cccttcgtct tcaccaccg 73860  
 gtacggacgc ggtcccctcc ccgagccgaa cgacgcgctg gaggggaacc gatgggtctt 73920

cgccccgaag cccggggcct gacgtgccgg ccgcgcttgc cgcccacgcc cggggagccc 73980  
 gctgacgagc ggtgtcagac ggtccgggcg gccaccagcc ggtcgcccgg gatcccgccc 74040  
 aggtccggcg cgtagtagtc ctcatgcccg gagggccacg cggccacggg gatgcgggtcc 74100  
 gcggcgctccg gggcggaaggc gtcgaacagc gcgtggatgt tcgcttcctc gaaaccgata 74160  
 gccttcatca gcgcgacgaa gaggggagc tcgatcagcc cgtccccgtc gggatcgccc 74220  
 agcgcgagaca gtgcccagac gaactcggcg atggtgggac cgaagcgctc gggatcgagt 74280  
 acgaacggac ggaactcctc cacgggtgat acgccgtcgc cgtcggcgctc cagttcggtg 74340  
 gccagcgtagg tccagtagcg gcggaacgcg gcccgagcg cggccttggc gctgtcgtcc 74400  
 gacccggccc cgcgcgcaac gacccggctc gtcacaggt cgaagtcgtc ggagtcgatg 74460  
 actccgttgc cgttggcgctc gaagaggag aagaccagct cgaccgctt ggcggcctca 74520  
 tctcgcatgc acatcacctg tcttctacgg cccggtcttc gcggggcccg ccccatgaat 74580  
 gctctgcgtg accgagcggg gcaggacgaa agcctccgag cggtcgcgtc ccagagaacc 74640  
 accatgaatg tccctgaact gcagatcggg catctgctgg cctgggtgcg gcgggggctg 74700  
 gcccggtgcg gcaggggagt gctctggtgc ctgggcaagg ccgtcacggg gatcatcctg 74760  
 ctcgccatct tcgcgtccgc gatgata 74787

&lt;210&gt; 2

&lt;211&gt; 876

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 2

Met Thr Gly Ser Ala Val Ser Ala Pro Phe Leu Gln Pro Pro Glu Pro  
 1 5 10 15  
 Val Ser Gly His Ser Glu Arg Lys Ser Asp Pro Val Leu Leu Val Gly  
 20 25 30  
 Ala Gly Arg Arg Ala Arg Met Ala Asp Ala Val Arg Ala Ala Gly Ala  
 35 40 45  
 Gln Ala Gly Ile Asp Pro Ala Val Leu Arg Arg Thr Arg Ala Thr Leu  
 50 55 60  
 Ile Thr Ala Gly Ser Ala Gly Ala Ala Gly Arg Leu Ala Ala Ala Leu  
 65 70 75 80  
 Arg Leu Thr Gly Ala Thr Ile Ser Leu Asp Thr Arg Glu Thr Pro Thr  
 85 90 95  
 Leu Leu Ala Leu His Leu Ala Ala Gln Ala Leu Arg Ala Gly Asp Thr  
 100 105 110  
 Ser Tyr Ala Val Val Gly Ala Glu Leu Pro Asp Gly Asn Cys Ala Leu  
 115 120 125  
 Ile Leu Ala Arg Gln Ser Ala Ala Thr Ala Glu Gly Ala Val Pro Gln  
 130 135 140



Ala Ile Val Arg Thr Thr Thr Ala Asp Arg Thr Thr Thr Ala Asp His  
145 150 155 160

Ala Pro Ala Pro Asp Asp His Gly Ser Pro Ala Arg Glu Ala Pro His  
165 170 175

Ala Thr Arg Thr Leu Ser Pro Gly Ile Thr Gln Ala Pro Ala Glu Gly  
180 185 190

Phe Pro Gly Leu Leu Ala Thr Leu His Asp Asp Thr Pro Leu Arg Pro  
195 200 205

Thr Ala Val Thr Glu His Gly Ser Asp Ala Thr Thr Val Leu Val Leu  
210 215 220

Leu Asp Gln Pro Gln Asp Ala Ala Pro Ala Ala Pro Leu Pro Trp Val  
225 230 235 240

Val Ser Ala Pro His Thr Arg Ala Leu Arg Ala Thr Ala Ala Thr Leu  
245 250 255

Ala Val His Leu Asp Thr Thr Pro Ala Ala Pro Ala Asp Val Ala His  
260 265 270

Thr Leu Leu Thr Ala Arg Pro Asp Arg His Arg Ala Ala Val Val Gly  
275 280 285

Ala Asp Arg Ala Thr Leu Thr Asp Gly Leu Arg Ala Leu Ala Thr Gly  
290 295 300

Gly Asp Ala Pro His Leu Val His Gly Thr Ala Thr Gly Ser Pro Arg  
305 310 315 320

Pro Val Phe Val Phe Pro Gly Gln Gly Ser Gln Trp Pro Gly Met Ala  
325 330 335

Ala Glu Leu Leu Glu Thr Ser Glu Pro Phe His Asp Ser Val His Ala  
340 345 350

Cys Ala Asp Ala Leu Ala Glu Phe Val Asp Trp Ser Val Leu Asp Val  
355 360 365

Leu Arg Gln Ala Pro Asp Ala Pro Pro Leu Arg Arg Val Asp Val Leu  
370 375 380

Gln Pro Thr Leu Trp Ala Thr Met Val Ser Leu Ala Glu Val Trp Arg  
385 390 395 400

Ser Tyr Gly Val Glu Pro Ala Ala Val Val Gly His Cys Tyr Gly Glu  
405 410 415

Ile Ala Ala Ala Gln Val Ala Gly Ala Leu Asp Met Arg Asp Ala Ala  
420 425 430

Arg Leu Leu Ala His Arg Ser Arg Ala Trp Leu Arg Leu Val Gly Lys  
435 440 445

Gly Thr Val Ile Ser Val Ala Thr Ser Gly Gln Asp Ile Thr Arg Arg  
450 455 460

Met Ala Ala Trp Pro Asp Ser Val Glu Leu Ala Ala Leu Asn Gly Pro  
465 470 475 480

Arg Ser Val Ala Leu Ala Gly Pro Pro Asp Val Leu Asp Gly Ile Val

42

835

840

845

Val Asp Asp Pro Ala Thr Asp Arg Phe Ala Ala Ala Thr Asp Asp Glu  
 850 855 860

Met Phe Glu Leu Leu Glu Lys Arg Phe Gly Ile Ser  
 865 870 875

&lt;210&gt; 3

&lt;211&gt; 1571

&lt;212&gt; PRT

&lt;213&gt; Streptomyces Parvulus Tü4055

&lt;400&gt; 3

Met Ala His Glu Asp Lys Leu Arg His Leu Leu Lys Arg Val Ser Ala  
 1 5 10 15

Glu Leu Asp Asp Thr Gln Arg Arg Val Arg Glu Met Glu Glu Ser Glu  
 20 25 30

Arg Glu Pro Ile Ala Ile Val Gly Met Ser Cys Arg Leu Pro Gly Gly  
 35 40 45

Val Asn Ser Pro Gly Glu Phe Trp Ser Leu Leu Glu Ala Gly Thr Asp  
 50 55 60

Ala Val Ser Glu Phe Pro Arg Asp Arg Gly Trp Asp Val Glu Asn Leu  
 65 70 75 80

Tyr Asp Pro Asp Pro Asp Ala Pro Gly Arg Ser Tyr Val Arg Glu Gly  
 85 90 95

Gly Phe Leu Asp Gly Ala Gly Gln Phe Asp Ala Ala Phe Phe Gly Ile  
 100 105 110

Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu  
 115 120 125

Glu Cys Ser Trp Glu Ala Ile Glu Arg Ser Arg Ile Asp Pro Lys Thr  
 130 135 140

Leu His Gly Ser Arg Thr Gly Val Phe Ala Gly Ser Asn Trp Gln Asp  
 145 150 155 160

Tyr Asn Thr Leu Leu Leu Asn Ala Glu Glu Arg Ser Gln Ser Tyr Leu  
 165 170 175

Ala Thr Gly Ala Ser Gly Ser Val Leu Ser Gly Arg Val Ser Tyr Thr  
 180 185 190

Leu Gly Met Glu Gly Pro Ala Ile Thr Val Asn Thr Ala Cys Ser Ser  
 195 200 205

Ser Leu Val Ala Val His Leu Ala Ala Arg Ser Leu Arg Ala Gly Glu  
 210 215 220

Cys Asp Leu Ala Leu Ala Gly Ala Val Thr Val Met Ser Thr Pro Gln  
 225 230 235 240

Leu Pro Val Ala Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg  
 245 250 255

Ser Lys Ala Phe Ala Val Ser Ala Asp Gly Met Gly Phe Gly Glu Gly  
 260 265 270

Val Gly Val Leu Val Leu Glu Arg Leu Ser Val Ala Arg Arg Asn Gly  
 275 280 285  
 His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly  
 290 295 300  
 Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val  
 305 310 315 320  
 Ile Arg Ala Ala Leu Ala Ser Ala Gly Leu Gly Pro Ala Asp Val Asp  
 325 330 335  
 Val Val Glu Ala His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu  
 340 345 350  
 Ala Gln Ala Leu Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Glu Arg  
 355 360 365  
 Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Ile Gly His Ala Gln Ala  
 370 375 380  
 Ala Ala Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Glu Lys  
 385 390 395 400  
 Gly Arg Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Gly Glu Val  
 405 410 415  
 Asp Trp Asp Ser Gly Ala Val Arg Leu Leu Thr Glu Ala Arg Asp Trp  
 420 425 430  
 Pro Ser Glu Glu Gly Arg Leu Arg Arg Ala Gly Val Ser Ser Phe Gly  
 435 440 445  
 Ile Ser Gly Thr Asn Ala His Val Ile Ile Glu Glu Ala Pro Glu Glu  
 450 455 460  
 Gly Glu Glu Pro Glu Ser Asp Ala Gly Gly Val Val Pro Trp Val Leu  
 465 470 475 480  
 Ser Ala Arg Thr Glu Gly Ala Leu Gln Ala Gln Ala Val Gln Leu Ser  
 485 490 495  
 Glu Phe Val Gly Glu Ser Ser Pro Val Asp Val Gly Trp Ser Leu Val  
 500 505 510  
 Ser Thr Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Arg Gly  
 515 520 525  
 Arg Asp Glu Leu Val Arg Gly Leu Ser Glu Val Ala Gln Gly Arg Gly  
 530 535 540  
 Val Arg Gly Val Ala Ser Ser Ala Ser Gly Gly Leu Ala Phe Val Phe  
 545 550 555 560  
 Ala Gly Gln Gly Ser Gln Arg Leu Gly Met Gly Arg Gly Leu Tyr Glu  
 565 570 575  
 Arg Phe Pro Val Phe Ala Glu Ala Phe Asp Glu Val Cys Gly Arg Val  
 580 585 590  
 Gly Pro Gly Val Arg Glu Val Val Phe Gly Ser Asp Ala Gly Glu Leu  
 595 600 605

Asp Arg Thr Val Trp Ala Gln Ala Gly Leu Phe Ala Leu Glu Val Ala  
 610 615 620  
 Leu Phe Arg Leu Leu Glu Ser Trp Gly Val Arg Pro Gly Cys Leu Ile  
 625 630 635 640  
 Gly His Ser Val Gly Glu Leu Ser Ala Ala Cys Val Ala Gly Leu Trp  
 645 650 655  
 Ser Leu Glu Asp Ala Cys Arg Val Val Ala Ala Arg Ala Arg Leu Met  
 660 665 670  
 Gln Ala Leu Pro Ala Gly Gly Val Met Val Ala Val Arg Ala Glu Ala  
 675 680 685  
 Gly Glu Leu Ala Gly Phe Leu Gly Glu Asp Val Val Ile Ala Ser Val  
 690 695 700  
 Asn Ala Pro Gly Gln Val Val Ile Ala Gly Pro Glu Gly Gly Val Glu  
 705 710 715 720  
 Arg Val Val Ala Ala Cys Gly Ala Arg Ser Arg Arg Leu Ala Val Ser  
 725 730 735  
 His Ala Phe His Ser Pro Leu Val Glu Pro Met Leu Gly Glu Phe Arg  
 740 745 750  
 Arg Val Val Glu Ser Val Ala Phe Gly Val Pro Ser Leu Arg Val Val  
 755 760 765  
 Ser Asn Val Thr Gly Ala Trp Val Asp Pro Glu Glu Trp Gly Thr Pro  
 770 775 780  
 Glu Tyr Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly  
 785 790 795 800  
 Val Ala Thr Leu Leu Asp Ala Gly Val Arg Thr Phe Val Glu Leu Gly  
 805 810 815  
 Pro Ala Gly Ala Leu Thr Ser Met Val Ser His Cys Ala Asp Ala Thr  
 820 825 830  
 Ala Thr Ser Val Thr Ala Val Pro Thr Leu Arg Pro Asp His Asp Glu  
 835 840 845  
 Ser Arg Thr Val Leu Ser Ala Ala Ala Ser Leu Tyr Val Gln Gly His  
 850 855 860  
 Pro Val Asp Trp Ala Pro Leu Phe Pro Arg Ala Arg Thr Val Asp Leu  
 865 870 875 880  
 Pro Thr Tyr Pro Phe Gln His Gln His Tyr Trp Leu Asp Val Pro Pro  
 885 890 895  
 Leu Phe Thr Ala Ser Ser Ala Ala Gln Asp Gly Gly Trp Arg Tyr Arg  
 900 905 910  
 Ile His Trp Arg Arg Leu Gly Thr Arg Asp Ser Gly Asp Arg Leu Ser  
 915 920 925  
 Gly Arg Trp Leu Leu Leu Val Pro Glu Ser Asp Gly Thr Glu Pro Trp  
 930 935 940  
 Val Glu Gly Ala Glu Lys Met Leu Ala Glu Arg Gly Cys Glu Val Val

945	950	955	960
His Val Pro Ile Ala Ala Thr Ala Asp Arg Asp Ala Met Val Gly Ala			
	965	970	975
Val Arg Glu Ser Val Glu Asp Gly Arg Val Asp Gly Val Leu Ser Leu			
	980	985	990
Leu Ala Leu Asp Gly Arg Pro His Pro Asp Ala Ala Ala Val Pro Thr			
	995	1000	1005
Gly Leu Val Ala Thr Ala Gln Val Val Gln Val Ser Asp Glu Leu Gly			
	1010	1015	1020
Ile Gly Pro Leu Trp Val Ala Thr Arg Gln Ala Val Ser Val Asp Gly			
	1025	1030	1035
Ala Asp Glu Ala Asp Gly Ala Gly Arg Thr Arg Lys Ala Asp Asp Pro			
	1045	1050	1055
Ala Asp Val Ala Gln Ala Ala Val Trp Gly Leu Gly Arg Val Ala Ala			
	1060	1065	1070
Leu Glu Lys Pro Arg Leu Trp Gly Gly Leu Val Asp Leu Pro Ala Arg			
	1075	1080	1085
Ala Asp Glu Arg Met Arg Asp Leu Val Ala Gln Ala Leu Thr Ala Pro			
	1090	1095	1100
Asp Ala Glu Asp Gln Leu Ala Val Arg Ala Asp Gly Ile Ala Val Arg			
	1105	1110	1115
Arg Leu Val Arg Ser Ala Ala Ser Ala Pro Ala Asp Asp Trp Gln Pro			
	1125	1130	1135
Ser Gly Thr Val Leu Val Thr Gly Gly Thr Gly Gly Val Gly Ala Asn			
	1140	1145	1150
Val Ala Arg Trp Leu Val Thr Gln Asp Ile Gln His Leu Leu Leu Val			
	1155	1160	1165
Ser Arg Arg Gly Pro Asp Ala Pro Gly Ala Ala Glu Leu Leu Ala Glu			
	1170	1175	1180
Leu Ser Ala Ser Gly Thr Ser Val Thr Ile Glu Pro Cys Asp Val Thr			
	1185	1190	1195
Asp Ala Asp Ala Val Arg Arg Leu Ile Gly Ala Val Pro Ala Glu Arg			
	1205	1210	1215
Pro Leu Ser Thr Val Val His Ala Ala Gly Val Leu Asp Asp Cys Leu			
	1220	1225	1230
Ile Asp Ala Leu Thr Pro Gln Arg Leu Ala Ala Ala Leu Glu Val Lys			
	1235	1240	1245
Ala Lys Gly Ala Leu Asn Leu His Glu Ala Ala Gly Glu Ala His Leu			
	1250	1255	1260
Val Leu Phe Ser Ser Leu Ala Gly Thr Thr Gly Thr Lys Gly Gln Gly			
	1265	1270	1275
Asn Tyr Ala Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Arg Arg			
	1285	1290	1295

Arg Ala Asp Gly Leu Pro Ala Thr Ser Val Ala Trp Gly Ala Trp Gln  
 1300 1305 1310

Gly Ala Gly Met Val Ala Asp Ala Ala Val Ala His Arg Thr Arg Arg  
 1315 1320 1325

Tyr Gly Leu Pro Leu Met Ser Pro Asp Arg Ala Val Ala Thr Leu Arg  
 1330 1335 1340

Gln Val Met Ala Glu Pro Val Ala Thr Gln Val Val Ala Asp Val Asp  
 1345 1350 1355 1360

Trp Gln Arg Phe Val Ala Asp Phe Thr Ala Val Arg Pro Ser Arg Leu  
 1365 1370 1375

Leu Ala Asp Leu Pro Glu Val Arg Ser Leu Gly Glu Gln Arg Lys Asp  
 1380 1385 1390

Gly Pro Gly Gly Gln Gly Glu Glu Asp Gly Leu Ala Ser Lys Leu Ala  
 1395 1400 1405

Ala Leu Pro Glu Ala Asp Arg Arg Arg Ala Val Leu Asp Leu Val Glu  
 1410 1415 1420

Glu Leu Val Leu Gly Val Leu Gly His Glu Thr Arg Ala Ala Ile Gly  
 1425 1430 1435 1440

Pro Asp Ser Ser Phe His Ala Ile Gly Phe Asp Ser Leu Thr Ala Val  
 1445 1450 1455

Glu Leu Arg Asn Leu Leu Thr Val Arg Leu Gly Met Lys Leu Pro Ala  
 1460 1465 1470

Thr Leu Val Tyr Asp His Pro Thr Leu Ser Ser Leu Ala Asp His Leu  
 1475 1480 1485

His Glu Gln Leu Val Ile Asp Gly Thr Pro Met Thr Asp Thr Ala Ala  
 1490 1495 1500

Asp Leu Leu Ala Glu Leu Asp Ala Leu Ala Ala Arg Leu Ala Ala Val  
 1505 1510 1515 1520

Gly Leu Glu Pro Glu Ala Arg Ala Arg Ile Gly Arg Arg Leu Lys Asp  
 1525 1530 1535

Met Gln Thr Ala Cys Glu Pro Arg Ser Glu Ser Ser Arg Asp Leu Lys  
 1540 1545 1550

Ser Ala Ser Arg Thr Glu Val Leu Asp Phe Leu Thr Asn Glu Leu Gly  
 1555 1560 1565

Ile Ser Arg  
 1570

<210> 4  
 <211> 3500  
 <212> PRT  
 <213> Streptomyces parvulus TU4055

<400> 4  
 Met Pro Asn Asp Glu Glu Leu Leu Asp Tyr Leu Lys Arg Thr Ala Ser  
 1 5 10 15

Asn Leu Gln Glu Ala Arg Gln Arg Val His Glu Leu Glu Glu Ser Glu  
 20 25 30  
 Arg Glu Pro Ile Ala Ile Val Gly Met Ser Cys Arg Leu Pro Gly Gly  
 35 40 45  
 Val Asn Ser Pro Glu Glu Phe Trp Ser Leu Leu Glu Ala Gly Thr Asp  
 50 55 60  
 Ala Val Ser Glu Phe Pro Arg Asp Arg Gly Trp Asp Val Glu Arg Leu  
 65 70 75 80  
 Tyr Asp Pro Asp Pro Asp Ala Pro Gly Lys Ser Tyr Val Arg Glu Gly  
 85 90 95  
 Gly Phe Leu Asp Gly Ala Gly Arg Phe Asp Pro Ala Phe Phe Gly Ile  
 100 105 110  
 Ser Pro Arg Glu Ala Val Val Met Asp Pro Gln Gln Arg Leu Leu Leu  
 115 120 125  
 Glu Cys Ser Trp Glu Ala Ile Glu Arg Ser Arg Ile Asp Pro Lys Thr  
 130 135 140  
 Leu His Gly Ser Arg Ala Gly Val Phe Val Gly Ser Asn Gly Gln Asp  
 145 150 155 160  
 Tyr Gly Thr Leu Leu Arg Ala Asp Asp Arg Ser His Ala Tyr Leu  
 165 170 175  
 Ala Thr Gly Ala Ser Ala Ser Val Leu Ser Gly Arg Ile Ser Tyr Thr  
 180 185 190  
 Leu Gly Leu Glu Gly Pro Ala Val Thr Ile Ser Thr Ala Cys Ser Ser  
 195 200 205  
 Ser Leu Val Ala Leu His Leu Ala Ala Arg Ala Leu Arg Ala Gly Glu  
 210 215 220  
 Cys Glu Leu Ala Leu Ala Gly Gly Val Thr Val Met Pro Thr Thr Arg  
 225 230 235 240  
 Leu Phe Glu Val Phe Ser Arg Gln Arg Gly Leu Ala Gly Asp Gly Arg  
 245 250 255  
 Cys Lys Ala Phe Ala Ala Gly Ala Asp Gly Thr Gly Trp Gly Glu Gly  
 260 265 270  
 Val Gly Val Leu Val Leu Glu Arg Leu Ser Val Ala Arg Arg Asn Gly  
 275 280 285  
 His Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly  
 290 295 300  
 Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val  
 305 310 315 320  
 Ile Arg Ala Ala Leu Ala Ser Ala Arg Leu Ala Pro Glu Asp Val Asp  
 325 330 335  
 Ala Val Glu Ala His Gly Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu  
 340 345 350  
 Ala Gln Ala Leu Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Glu Arg



355					360					365					
Pro	Leu	Trp	Leu	Gly	Ser	Val	Lys	Ser	Asn	Ile	Gly	His	Ala	Gln	Ala
370						375					380				
Ala	Ala	Gly	Val	Ala	Gly	Val	Ile	Lys	Met	Val	Lys	Ala	Met	Gln	Ala
385						390					395				400
Gly	Thr	Leu	Pro	Arg	Thr	Leu	His	Val	Asp	Glu	Pro	Ser	Gly	Glu	Val
				405					410					415	
Asp	Trp	Asp	Ser	Gly	Ala	Val	Arg	Leu	Leu	Thr	Glu	Ala	Arg	Asp	Trp
			420					425					430		
Pro	Ser	Glu	Glu	Gly	Arg	Leu	Arg	Arg	Ala	Gly	Val	Ser	Ser	Phe	Gly
		435					440					445			
Ile	Ser	Gly	Thr	Asn	Ala	His	Val	Ile	Leu	Glu	Glu	Pro	Pro	Ala	Glu
	450					455					460				
Asp	Ala	Val	Pro	Glu	Pro	Glu	Ala	Gly	Asp	Val	Val	Pro	Trp	Val	Leu
465						470					475				480
Ser	Ala	Arg	Ser	Ala	Glu	Ala	Leu	Arg	Glu	Gln	Ala	Ala	Arg	Leu	Ala
			485						490					495	
Ser	Val	Ala	Gly	Gly	Leu	Asn	Val	Val	Asp	Val	Gly	Trp	Ser	Leu	Ala
			500					505					510		
Ser	Thr	Arg	Ala	Ala	Phe	Glu	His	Arg	Ala	Val	Val	Val	Gly	Arg	Glu
		515					520						525		
Arg	Glu	Glu	Leu	Leu	Ala	Gly	Leu	Phe	Ala	Val	Ala	Ala	Gly	Arg	Pro
	530					535					540				
Ala	Ala	Asn	Val	Val	Thr	Gly	Pro	Val	Ser	Ser	Gly	Arg	Pro	Ala	Phe
545						550					555				560
Val	Phe	Ala	Gly	Gln	Gly	Ser	Gln	Arg	Leu	Gly	Met	Gly	Arg	Gly	Leu
			565						570					575	
Tyr	Glu	Arg	Phe	Pro	Val	Phe	Ala	Glu	Ala	Phe	Asp	Glu	Val	Cys	Gly
		580					585						590		
Arg	Val	Gly	Pro	Gly	Val	Arg	Glu	Val	Val	Phe	Gly	Ser	Asp	Ala	Gly
		595					600					605			
Glu	Leu	Asp	Arg	Thr	Val	Trp	Ala	Gln	Ala	Gly	Leu	Phe	Ala	Leu	Glu
	610					615					620				
Val	Ala	Leu	Phe	Arg	Leu	Leu	Glu	Ser	Trp	Gly	Val	Arg	Pro	Gly	Cys
625						630					635				640
Leu	Ile	Gly	His	Ser	Val	Gly	Glu	Leu	Ser	Ala	Ala	Cys	Val	Ala	Gly
			645						650					655	
Leu	Trp	Ser	Leu	Glu	Asp	Ala	Cys	Arg	Val	Val	Ala	Ala	Arg	Ala	Arg
			660					665					670		
Leu	Met	Gln	Ala	Leu	Pro	Ala	Gly	Gly	Val	Met	Val	Ala	Val	Arg	Ala
		675					680					685			
Glu	Ala	Gly	Glu	Leu	Ala	Gly	Phe	Leu	Gly	Glu	Asp	Val	Val	Ile	Ala
	690					695					700				

Ser Val Asn Ala Pro Gly Gln Val Val Ile Ala Gly Pro Glu Gly Gly  
 705 710 715 720  
 Val Glu Arg Val Val Ala Ala Cys Gly Ala Arg Ser Arg Arg Leu Ala  
 725 730 735  
 Val Ser His Ala Phe His Ser Pro Leu Val Glu Pro Met Leu Gly Glu  
 740 745 750  
 Phe Arg Arg Val Val Glu Ser Val Ala Phe Gly Val Pro Ser Leu Arg  
 755 760 765  
 Val Val Ser Asn Val Thr Gly Ala Trp Val Asp Pro Glu Glu Trp Gly  
 770 775 780  
 Thr Pro Glu Tyr Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala  
 785 790 795 800  
 Asp Gly Val Ala Thr Leu Leu Asp Ala Gly Val Arg Thr Phe Val Glu  
 805 810 815  
 Leu Gly Pro Ala Gly Thr Leu Thr Ser Met Val Ser His Cys Ala Asp  
 820 825 830  
 Ala Thr Ala Thr Ser Val Thr Ala Val Pro Thr Leu Arg Pro Asp His  
 835 840 845  
 Asp Glu Ser Arg Thr Val Leu Ser Ala Ala Ala Ser Leu Tyr Val Gln  
 850 855 860  
 Gly His Pro Val Asp Trp Ala Pro Leu Phe Pro Arg Ala Arg Thr Val  
 865 870 875 880  
 Asp Leu Pro Thr Tyr Pro Phe Gln His Gln His Tyr Trp Met Met Asn  
 885 890 895  
 Thr Gly Ser Ala Ala Glu Pro Ala Glu Leu Gly Leu Gly Asp Ala Arg  
 900 905 910  
 His Pro Leu Leu Gly Ser Val Val Thr Val Ala Gly Asp Asp Lys Val  
 915 920 925  
 Val Phe Ala Gly Arg Leu Ala Leu Arg Thr His Pro Trp Leu Ala Asp  
 930 935 940  
 His Thr Val Leu Asp Ala Val Leu Leu Pro Ala Thr Ala Phe Leu Glu  
 945 950 955 960  
 Leu Ala Val Arg Ala Gly Glu Glu Val Ser Cys Pro Val Val His Asp  
 965 970 975  
 Leu Thr Leu His Arg Pro Leu Val Val Pro Glu Arg Gly Ala Val Gln  
 980 985 990  
 Val Gln Met Ala Val Gly Ala Pro Glu Ala Asp Gly Arg Arg Glu Val  
 995 1000 1005  
 Arg Val Tyr Ser Arg Pro Asp Asp Ala Glu His Glu Trp Thr Leu  
 1010 1015 1020  
 His Ala Ala Gly Leu Leu Ala Ser Ala Ala Thr Ala Glu Pro Ala Val  
 1025 1030 1035 1040

Ala Ala Gly Ala Trp Pro Pro Pro Glu Ala Gln Ala Val Asp Leu Asp  
 1045 1050 1055  
 Gly Phe Tyr Ala Gly Leu Ala Glu His Gly Tyr His Tyr Gly Pro Leu  
 1060 1065 1070  
 Phe Gln Gly Val Arg Ala Ala Trp Arg Leu Gly Asp Asp Val Leu Ala  
 1075 1080 1085  
 Glu Ile Val Leu Pro Glu Ala Ala Gly Ala Asp Ala Ala Arg Tyr Gly  
 1090 1095 1100  
 Met His Pro Ala Leu Leu Asp Ala Val Leu His Ala Ala Arg Leu Gly  
 1105 1110 1115 1120  
 Ala Phe Arg Glu Arg Ser Glu Glu Lys Tyr Leu Pro Phe Ala Trp Glu  
 1125 1130 1135  
 Gly Val Thr Leu Arg Thr Arg Gly Ala Thr Ala Val Arg Ala Arg Ile  
 1140 1145 1150  
 Ser Arg Ala Gly Thr Asp Ala Ile Arg Leu Asp Val Thr Asp Thr Ala  
 1155 1160 1165  
 Asp Arg Pro Val Leu Thr Ala Glu Ser Leu Thr Leu Arg Pro Val Ser  
 1170 1175 1180  
 Ala Gly Gln Leu Met Ala Val Pro Arg Asp Ser Leu Phe Arg Val Asp  
 1185 1190 1195 1200  
 Trp Val Ser Ala Pro Ala Ala Asn Gly Pro Gly Leu Arg Leu Ala Arg  
 1205 1210 1215  
 Ala Ala Thr Val Glu Ala Ala Leu Ala Ala Asp Ala Asp Ile Val Val  
 1220 1225 1230  
 Val Pro Cys Leu Asp Ser Glu Gly Pro His Gln Ala Thr Tyr Gln Ala  
 1235 1240 1245  
 Leu Glu Leu Leu Gln Arg Trp Leu Ala Ala Asp Thr Gly Thr Thr Thr  
 1250 1255 1260  
 Leu Ala Leu Leu Thr His Arg Ala Val Ala Val Gly Asp Asp Val His  
 1265 1270 1275 1280  
 Asp Leu His His Ala Pro Leu Trp Gly Leu Val Arg Thr Ala Gln Thr  
 1285 1290 1295  
 Glu His Pro Gly Cys Phe Arg Leu Val Asp Ser Asp Asp Pro Asp Pro  
 1300 1305 1310  
 Thr Thr Asp Val Leu Ala Ala Ala Leu Ala Thr Gly Glu Pro Gln Val  
 1315 1320 1325  
 Ala Ile Arg Asp Gly Ala Val Leu Ala Pro Arg Leu Thr Ala Ala Ser  
 1330 1335 1340  
 Ala Pro Arg Glu Pro Ala Glu Trp Asp Ala Glu Gly Thr Val Leu Ile  
 1345 1350 1355 1360  
 Thr Gly Gly Ser Gly Ala Leu Ala Gly Ile Val Ala Gln His Leu Val  
 1365 1370 1375  
 Ala Arg His Gly Val Arg Arg Leu Val Leu Ala Ser Arg Ser Gly Arg

1380	1385	1390
Pro Ala Pro Gly Ala Asp Leu Leu Asp Ala Asp Val Thr Ala Val Ser 1395 1400 1405		
Cys Asp Val Ser Asp Arg Asp Ala Val Ala Ala Leu Leu Ala Ser Val 1410 1415 1420		
Pro Asp Glu His Pro Leu Thr Ala Val Val His Thr Ala Gly Val Leu 1425 1430 1435 1440		
Asp Asp Gly Val Leu His Ala Leu Thr Thr Glu Arg Ile Asp Thr Ser 1445 1450 1455		
Phe Ala Ala Lys Val Asp Gly Ala Arg His Leu His Glu Leu Thr Ser 1460 1465 1470		
His Leu Asp Leu Thr Ala Phe Val Leu Phe Ser Ser Ala Ser Ala Val 1475 1480 1485		
Leu Gly Ala Ala Gly Gln Gly Asn Tyr Ala Ala Ala Asn Ala Tyr Leu 1490 1495 1500		
Asp Ala Leu Ala Ala His Arg Arg Ser Asn Asp Leu Pro Ala Val Ser 1505 1510 1515 1520		
Leu Ala Trp Gly Leu Trp Ala Glu His Glu Gly Met Ala Arg Gly Leu 1525 1530 1535		
Gly Asp Ala Glu Leu Thr Arg Ile Ser Arg Ile Gly Val Thr Ala Leu 1540 1545 1550		
Ser Ala Glu Asp Gly Met Arg Leu Phe Asp Ala Gly Cys Ala Gly Asp 1555 1560 1565		
Gln Ser Gln Leu Val Pro Met Arg Val Asp Thr Ala Ala Leu Arg Ala 1570 1575 1580		
Arg Arg Asp His Leu Pro Ala Pro Met Trp Ser Leu Val Pro Glu Arg 1585 1590 1595 1600		
Thr Arg Ala Ala Arg Thr Gln Pro Ala Ala Ser Leu Arg Asp Arg Leu 1605 1610 1615		
Ala Glu Leu Thr Ala Pro Glu Arg Lys Arg Thr Val Leu Asn Leu Val 1620 1625 1630		
Arg Asn Ala Val Ala Asp Thr Leu Gly His Asn Ala Ala Asp Gly Val 1635 1640 1645		
Pro Pro Asp Gln Ser Leu Asp Ala Ala Gly Phe Asp Ser Leu Thr Ala 1650 1655 1660		
Val Glu Phe Arg Asn Arg Leu Ser Ala Val Thr Asp Leu Arg Leu Pro 1665 1670 1675 1680		
Ala Thr Leu Thr Tyr Asp His Pro Thr Pro Ala Ala Ile Ala Glu His 1685 1690 1695		
Ile Leu Thr Arg Leu Thr Leu Leu Lys Glu Thr Ala Ala Pro Ala Val 1700 1705 1710		
Gly Thr Ala Pro Val Ala Ala Pro Thr Glu Asp Asp Ala Ile Val Ile 1715 1720 1725		

Val Gly Met Ala Gly Arg Phe Pro Gly Gly Val Arg Thr Pro Glu Gly  
 1730 1735 1740  
 Leu Trp Asp Leu Val His Ser Gly Thr Asp Ala Ile Ser Glu Trp Pro  
 1745 1750 1755 1760  
 Thr Asp Arg Gly Trp Asp Val Glu Asn Leu Tyr Asp Pro Asp Pro Asp  
 1765 1770 1775  
 Ala Val Gly Lys Ser Tyr Val Arg His Gly Gly Phe Leu His Asp Val  
 1780 1785 1790  
 Ala Gly Phe Asp Ala Gly Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu  
 1795 1800 1805  
 Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Cys Ser Tyr Glu Ala  
 1810 1815 1820  
 Leu Glu Arg Ala Gly Ile Asp Pro Ala Thr Leu Arg Gly Ser Arg Ser  
 1825 1830 1835 1840  
 Gly Val Tyr Ala Gly Val Met Tyr His Glu Tyr Ala Ser Arg Leu Gly  
 1845 1850 1855  
 Ala Thr Pro Ala Gly Phe Glu Gly Thr Leu Gly Thr Gly Ser Ser Gly  
 1860 1865 1870  
 Ser Ile Ala Ser Gly Arg Ile Ser Tyr Thr Phe Asp Leu Thr Gly Pro  
 1875 1880 1885  
 Ala Val Thr Val Asp Thr Ala Cys Ser Thr Ser Leu Val Gly Leu His  
 1890 1895 1900  
 Leu Ala Val Gln Ala Leu Arg Ala Gly Glu Cys Glu Leu Ala Leu Ala  
 1905 1910 1915 1920  
 Gly Gly Val Thr Val Met His Thr Pro Arg Pro Phe Val Glu Phe Ser  
 1925 1930 1935  
 Arg Gln Arg Gly Leu Ala Ala Asp Gly Arg Ser Lys Ala Phe Ala Ala  
 1940 1945 1950  
 Ser Ala Asp Gly Val Ala Trp Ala Glu Gly Ala Gly Ile Leu Val Leu  
 1955 1960 1965  
 Glu Arg Leu Ser Ala Ala Arg Arg Asn Gly His Arg Val Leu Ala Val  
 1970 1975 1980  
 Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr  
 1985 1990 1995 2000  
 Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg Ala Ala Leu Ala  
 2005 2010 2015  
 Ser Ala Gly Leu Gly Pro Ala Asp Val Asp Val Val Glu Ala His Gly  
 2020 2025 2030  
 Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala  
 2035 2040 2045  
 Thr Tyr Gly Arg Gly Arg Asp Ala Asp Arg Pro Leu Trp Leu Gly Ser  
 2050 2055 2060

Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Gly Val Ala Ser  
 2065 2070 2075 2080  
 Val Ile Lys Met Val Gln Ala Met Gln Ala Gly Val Leu Pro Arg Thr  
 2085 2090 2095  
 Leu His Val Asp Glu Pro Ser Gly Glu Val Asp Trp Asp Ser Gly Ala  
 2100 2105 2110  
 Val Arg Leu Leu Thr Glu Ala Arg Glu Trp Pro Ser Gly Glu Gly Arg  
 2115 2120 2125  
 Val Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser Gly Thr Asn Ala  
 2130 2135 2140  
 His Val Ile Leu Glu Glu Pro Pro Ala Glu Asp Ala Leu Pro Glu Pro  
 2145 2150 2155 2160  
 Glu Ala Gly Asp Val Val Pro Trp Val Leu Ser Ala Arg Ser Ala Glu  
 2165 2170 2175  
 Ala Leu Arg Glu Gln Ala Ala Arg Leu Ala Ser Val Ala Gly Gly Leu  
 2180 2185 2190  
 Asn Val Val Asp Val Gly Trp Ser Leu Ala Ser Thr Arg Ala Ala Phe  
 2195 2200 2205  
 Glu His Arg Ala Val Val Val Gly Gly Asp Arg Glu Glu Leu Leu Gly  
 2210 2215 2220  
 Lys Leu Ser Ser Val Ser Gly Val Glu Val Gly Val Gly Val Gly Ala  
 2225 2230 2235 2240  
 Gly Gly Gly Val Val Leu Val Phe Ala Gly Gln Gly Cys Gln Trp Val  
 2245 2250 2255  
 Gly Met Gly Arg Glu Leu Leu Gly Ser Ser Leu Val Phe Ala Glu Ser  
 2260 2265 2270  
 Met Arg Glu Cys Ala Ala Ala Leu Ser Pro Phe Val Asp Phe Ser Val  
 2275 2280 2285  
 Val Asp Val Leu Gly Ser Ala Gly Glu Leu Gly Arg Val Glu Val Val  
 2290 2295 2300  
 Gln Pro Ala Leu Trp Ala Val Met Val Ser Leu Ala Arg Val Trp Arg  
 2305 2310 2315 2320  
 Ser Trp Gly Val Pro Val Ala Ala Val Val Gly His Ser Gln Gly Glu  
 2325 2330 2335  
 Ile Ala Ala Ala Thr Val Ala Gly Ala Leu Ser Val Gly Asp Ala Ala  
 2340 2345 2350  
 Arg Val Val Ala Leu Arg Ser Arg Leu Ile Ala Glu Arg Leu Ser Gly  
 2355 2360 2365  
 Leu Gly Gly Met Val Ser Val Ala Leu Ser Arg Glu Arg Val Val Ser  
 2370 2375 2380  
 Leu Ile Ala Gly Val Pro Gly Val Ser Val Ala Ala Val Asn Gly Ser  
 2385 2390 2395 2400  
 Ser Ser Thr Val Val Ser Gly Glu Ala Ala Gly Leu Glu Arg Val Leu

2405	2410	2415
Ala Ala Cys Val Ser Ser Gly Val Arg Ala Arg Arg Ile Asp Val Asp		
2420	2425	2430
Tyr Ala Ser His Ser Val Gln Val Glu Leu Ile Arg Glu Glu Leu Leu		
2435	2440	2445
Gly Val Leu Asp Gly Ile Val Pro Arg Ser Gly Glu Ile Pro Phe Val		
2450	2455	2460
Ser Thr Val Thr Gly Glu Arg Ile Asp Thr Val Glu Leu Gly Ala Glu		
2465	2470	2475 2480
Tyr Trp Tyr Arg Asn Leu Arg Gln Thr Val Glu Phe Gln Ser Val Val		
2485	2490	2495
Glu Gly Leu Val Ala Gln Gly Cys Arg Val Phe Leu Glu Ser Ser Pro		
2500	2505	2510
His Pro Val Leu Thr Val Gly Ile Glu Glu Ser Ala Asp Arg Val Val		
2515	2520	2525
Ala Leu Glu Ser Leu Arg Arg Gly Glu Gly Gly Leu Arg Arg Leu Val		
2530	2535	2540
Asp Ala Ala Gly Glu Ala Trp Val Arg Gly Val Pro Ile Asp Trp Ala		
2545	2550	2555 2560
Gly Met Leu Ala Gly Gly Arg Arg Val Asp Leu Pro Thr Tyr Pro Phe		
2565	2570	2575
Gln His Gln Pro Tyr Trp Leu Asp Ser Pro Arg His Pro Ala Gly Asp		
2580	2585	2590
Val Thr Ala Val Gly Leu Thr Glu Ala Gly His Ala Phe Val Pro Ala		
2595	2600	2605
Ala Val Asp Leu Pro Asp Gly Gln Arg Val Trp Thr Gly Arg Leu Ser		
2610	2615	2620
Leu Pro Ser Tyr Pro Trp Leu Ala Asp His Gln Val Leu Gly Gln Val		
2625	2630	2635 2640
Leu Leu Pro Gly Val Val Trp Val Glu Leu Ala Leu His Ala Gly His		
2645	2650	2655
Gln Ala Gly Cys Asp Ser Val Asp Glu Leu Thr Leu Gln Ser Pro Leu		
2660	2665	2670
Val Leu Gly Ala Ser Asp Thr Val Gln Val Arg Val Val Thr Glu		
2675	2680	2685
Thr Glu Glu Pro Gly Thr Arg Thr Val Ser Met His Ser Arg Arg Asp		
2690	2695	2700
Asp Gly Ser Trp Val Thr His Ala Glu Gly Ile Leu Gly Ala Gly Gly		
2705	2710	2715 2720
Pro Pro Pro Glu Pro Leu Pro Glu Trp Pro Pro Thr Gly Ala Met Pro		
2725	2730	2735
Leu Asp Val Glu Gly Phe Tyr Asp Glu Leu Ala Ala Gly Gly Tyr His		
2740	2745	2750

Tyr Gly Pro Gln Phe Arg Cys Leu Arg Arg Ala Trp Arg Ala Gly Glu  
 2755 2760 2765  
 Asp Leu Val Ala Glu Ile Ser Leu Pro Glu Gly Thr Asp Val Asp Ala  
 2770 2775 2780  
 Tyr Gly Leu His Pro Gly Leu Phe Asp Ala Ala Val His Ser Val Ala  
 2785 2790 2795 2800  
 Cys Ala Arg Thr Ser Ala Gly Ala Gly Asp Asp Gly Pro Arg Leu Pro  
 2805 2810 2815  
 Phe Ala Phe Ser Asp Val Arg Leu Phe Ala Thr Gly Val Thr Ser Leu  
 2820 2825 2830  
 Arg Val Arg Ile Asp Pro Gln Asn Ser Ser Trp Gln Ala Trp Asp Glu  
 2835 2840 2845  
 Ser Gly Leu Pro Val Leu Thr Ile Gly Arg Leu Ala Gly Arg Pro Val  
 2850 2855 2860  
 Asp Ala Asp Gln Phe Ala Val Arg Arg Ala Gly His Leu Phe Arg Val  
 2865 2870 2875 2880  
 Glu Thr Arg His Glu Ala Leu Ala Gly Pro Ala Pro Ala Ser Trp Ala  
 2885 2890 2895  
 Val Ile Gly Ala Asp Pro Ala Gly Tyr Ala Ala Ala Leu Glu Ala Thr  
 2900 2905 2910  
 Gly Ala Gln Val Thr Thr Ala Ala Asp Leu Ala Gly Leu Thr Ser Ala  
 2915 2920 2925  
 Pro Glu Ala Ala Leu Phe Thr Leu Pro Gly Thr Lys Asp Ala Gly Val  
 2930 2935 2940  
 Thr Glu Glu Val Pro Thr Ala Val Arg Glu Ala Thr Ala Gln Val Leu  
 2945 2950 2955 2960  
 Glu Val Leu Gln Asp Trp Leu Thr Asp Gly Arg Phe Asp Asp Ala Arg  
 2965 2970 2975  
 Leu Val Val Val Ser Arg Glu Ala Glu Asp Gly Asp Leu Leu His Gly  
 2980 2985 2990  
 Thr Ala Arg Gly Leu Leu Arg Ala Ala Gln Ala Glu His Pro Asp Arg  
 2995 3000 3005  
 Ile Thr Leu Val Asp Leu Asp Ala His Pro Ala Ser Leu Thr Ala Leu  
 3005 3015 3020  
 Pro Gly Phe Ala Leu Gly Pro Glu Pro Glu Val Val Val Arg Ala Gly  
 3025 3030 3035 3040  
 Asp Gly Arg Ala Pro Arg Leu Ala Arg Ala Gln Ala Pro Thr Gly Ala  
 3045 3050 3055  
 Gly Ser Leu Gly Thr Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Thr  
 3060 3065 3070  
 Leu Gly Gly Leu Leu Ala Arg His Leu Val Glu Thr His Gly Val Thr  
 3075 3080 3085



Arg Leu Leu Leu Val Ser Arg Arg Gly Pro Ala Ala Asp Gly Ala Asp  
 3090 3095 3100  
 Arg Leu His Ala Glu Leu Thr Gly His Gly Ala His Val Asp Ile Val  
 3105 3110 3115 3120  
 Ala Ala Asp Leu Gly Asp Arg Thr Ser Val Ala Ala Leu Leu Ala Thr  
 3125 3130 3135  
 Val Asp Ala Asp His Pro Leu Ser Ala Val Val His Ala Ala Gly Ala  
 3140 3145 3150  
 Leu Asp Asp Gly Val Leu Gly Thr Arg Ser Ala Asp Trp Leu Asp Pro  
 3155 3160 3165  
 Val Leu Arg Pro Lys Ala Asp Ala Ala Trp His Leu His Glu Leu Thr  
 3170 3175 3180  
 Ala Glu Leu Pro Leu Thr Ala Phe Val Met Phe Ser Ser Ala Ala Ser  
 3185 3190 3195 3200  
 Val Leu Gly Ala Ala Gly Gln Ala Asn Tyr Ala Ala Ala Asn Gly Phe  
 3205 3210 3215  
 Leu Asp Ala Leu Ala Ala His Arg Ala Ala Arg Gly Leu Pro Gly Thr  
 3220 3225 3230  
 Ser Leu Ala Trp Gly Leu Trp Glu His Arg Ser Glu Leu Thr Arg His  
 3235 3240 3245  
 Thr Gly Ser Pro Ser Arg Ser Ile Ala Ala Val Gly Ala Leu Ser Thr  
 3250 3255 3260  
 Ala Glu Ala Leu Ala Ala Phe Asp Ala Gly Leu Ala Ser Gly Glu Pro  
 3265 3270 3275 3280  
 Leu Ala Val Pro Ile Arg Leu Glu Ser Thr Ser Ser Glu Glu Val Pro  
 3285 3290 3295  
 Pro Met Leu Arg Gly Leu Val Arg Val Arg Arg Arg Ala Ala Thr Gly  
 3300 3305 3310  
 Thr Glu Pro Ala Ala Ser Ala Gly Ala Ala Gln Glu Val Arg Gln Leu  
 3315 3320 3325  
 Ala Glu Leu Gly Ala Asp Glu Arg Gln Arg Arg Val Gln Arg Ile Val  
 3330 3335 3340  
 Leu Asp Thr Ala Ala Ala Val Leu Gly His Asp Ser His Asp Ala Ile  
 3345 3350 3355 3360  
 Pro Leu Thr Arg Gly Phe Leu Glu Leu Gly Phe Asp Ser Leu Thr Ala  
 3365 3370 3375  
 Val Arg Leu Arg Asn Arg Leu Ala Arg Arg Leu Gly Leu Arg Leu Pro  
 3380 3385 3390  
 Ala Thr Val Val Phe Asp His Pro Ser Pro Ala Ala Leu Ala Ala His  
 3395 3400 3405  
 Leu Val Glu His Leu Val Gly Thr Val Asp Pro Thr Ala Gln Ala Met  
 3410 3415 3420  
 Glu Gln Leu Glu Ala Leu Arg Arg Ser Val His Ala Ala Thr Pro Ala

```

<210> 5
<211> 1620
<212> PRT
<213> Streptomyces parvulus Tü4055

<400> 5
Met Asn Gly Asp Asp Lys Ala Leu Ala Tyr Leu Lys Arg Val Thr Ala
 1          5          10          15
Asp Leu Arg Ser Ala Arg Ala Arg Leu Gln Glu Leu Glu Ser Ala Asp
          20          25          30
Thr Asp Pro Ile Ala Ile Ile Gly Met Gly Cys Arg Leu Pro Gly Gly
          35          40          45
Val Arg Thr Pro Glu Asp Leu Trp Asp Leu Val Glu Lys Lys His Asp
          50          55          60
Ala Ile Gly Pro Phe Pro Ala Asp Arg Gly Trp Asp Leu Glu Asn Leu
          65          70          75          80
Tyr Asp Pro Asp Pro Asp Ala Pro Gly Lys Ala Tyr Val Arg Glu Gly
          85          90          95
Gly Phe Val His Asp Val Ala Gly Phe Asp Ala Gly Phe Phe Gly Ile
          100          105          110
Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln His Arg Leu Leu Leu
          115          120          125
Glu Cys Ser Trp Glu Ala Leu Glu Arg Ala Gly Ile Asp Pro Ser Ser
          130          135          140
Leu Glu Gly Thr Arg Thr Gly Val Tyr Thr Gly Leu Met Thr His Glu
          145          150          155          160
Tyr Ala Thr Arg Leu Pro Ser Ile Asp Glu Glu Leu Glu Gly Val Ile
          165          170          175
Gly Ile Gly Asn Ala Gly Ser Val Ala Ser Gly Arg Val Ser Tyr Thr
          180          185          190
Leu Gly Leu Asn Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser
          195          200          205
Ser Leu Val Ala Leu His Leu Ala Ala Gln Ala Leu Arg Gln Gly Gln
          210          215          220
Cys Thr Leu Ala Leu Ala Gly Gly Ala Ser Val Ile Ala Ala Pro Thr

```

225		230		235		240
Val Phe Ala Thr	Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg					
	245			250		255
Cys Lys Ala Phe	Ser Ser Thr Thr Asp Gly Thr Gly Phe Gly Glu Gly					
	260		265			270
Val Gly Val Leu	Val Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly					
	275		280			285
His Glu Val Leu	Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly					
	290		295			300
Ala Ser Ser Gly	Phe Thr Ala Pro Asn Gly Pro Ser Gln Gln Asp Val					
305		310		315		320
Ile Arg Glu Ala	Leu Ala Asp Gly Arg Leu Thr Pro Ala Asp Val Asp					
	325		330			335
Val Val Glu Gly	His Gly Thr Gly Thr Arg Leu Gly Asp Pro Ile Glu					
	340		345			350
Ala Gln Ala Leu	Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Asp Arg					
	355		360			365
Pro Leu Trp Leu	Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala					
	370		375			380
Ala Ala Gly Val	Ala Ser Val Ile Lys Met Val Gln Ala Met Gln Ala					
385		390		395		400
Gly Val Leu Pro	Arg Thr Leu His Val Asp Glu Pro Ser Gly Glu Val					
	405		410			415
Asp Trp Asp Ser	Gly Ala Val Arg Leu Leu Thr Glu Ala Arg Glu Trp					
	420		425			430
Pro Ser Gly Glu	Gly Arg Val Arg Arg Ala Gly Val Ser Ser Phe Gly					
	435		440			445
Ile Ser Gly Thr	Asn Ala His Val Ile Leu Glu Glu Pro Pro Ala Glu					
	450		455			460
Asp Ala Leu Pro	Glu Pro Glu Ala Gly Asp Val Val Pro Trp Val Leu					
465		470		475		480
Ser Ala Arg Ser	Ala Glu Ala Leu Arg Glu Gln Ala Ala Arg Leu Ala					
	485		490			495
Ser Val Ala Gly	Gly Leu Asn Val Val Asp Val Gly Trp Ser Leu Ala					
	500		505			510
Ser Thr Arg Ala	Ala Phe Glu His Arg Ala Val Val Val Gly Gly Asp					
	515		520			525
Arg Glu Glu Leu	Leu Gly Lys Leu Ser Ser Val Ser Gly Val Glu Val					
	530		535			540
Gly Val Gly Val	Gly Ala Gly Gly Gly Val Val Leu Val Phe Ala Gly					
545		550		555		560
Gln Gly Cys Gln	Trp Val Gly Met Gly Arg Glu Leu Leu Gly Ser Ser					
	565		570			575

Leu Val Phe Ala Glu Ser Met Arg Glu Cys Ala Ala Ala Leu Ser Pro  
 580 585 590  
 Phe Val Asp Phe Ser Val Val Asp Val Leu Gly Ser Ala Gly Glu Leu  
 595 600 605  
 Gly Arg Val Glu Val Val Gln Pro Ala Leu Trp Ala Val Met Val Ser  
 610 615 620  
 Leu Ala Arg Val Trp Arg Ser Trp Gly Val Pro Val Ala Ala Val Val  
 625 630 635 640  
 Gly His Ser Gln Gly Glu Ile Ala Ala Ala Thr Val Ala Gly Ala Leu  
 645 650 655  
 Ser Val Gly Asp Ala Ala Arg Val Val Ala Leu Arg Ser Arg Leu Ile  
 660 665 670  
 Ala Glu Arg Leu Ser Gly Leu Gly Gly Met Val Ser Val Ala Leu Ser  
 675 680 685  
 Arg Glu Arg Val Val Ser Leu Ile Ala Gly Val Pro Gly Val Ser Val  
 690 695 700  
 Ala Ala Val Asn Gly Ser Ser Ser Thr Val Val Ser Gly Glu Ala Ala  
 705 710 715 720  
 Gly Leu Glu Arg Val Leu Ala Ala Cys Val Ser Ser Gly Val Arg Ala  
 725 730 735  
 Arg Arg Ile Asp Val Asp Tyr Ala Ser His Ser Val Gln Val Glu Leu  
 740 745 750  
 Ile Arg Glu Glu Leu Leu Gly Val Leu Asp Gly Ile Val Pro Arg Ser  
 755 760 765  
 Gly Glu Ile Pro Phe Val Ser Thr Val Thr Gly Glu Arg Ile Asp Thr  
 770 775 780  
 Val Glu Leu Gly Ala Glu Tyr Trp Tyr Arg Asn Leu Arg Gln Thr Val  
 785 790 795 800  
 Glu Phe Gln Ser Val Val Glu Gly Leu Val Ala Gln Gly Cys Arg Val  
 805 810 815  
 Phe Leu Glu Ser Ser Pro His Pro Val Leu Thr Val Gly Ile Glu Glu  
 820 825 830  
 Ser Ala Asp Arg Val Val Ala Leu Glu Ser Leu Arg Arg Gly Glu Gly  
 835 840 845  
 Gly Leu Arg Arg Leu Val Asp Ala Ala Gly Glu Ala Trp Val Arg Gly  
 850 855 860  
 Val Pro Ile Asp Trp Ala Gly Met Leu Ala Gly Gly Arg Arg Val Asp  
 865 870 875 880  
 Leu Pro Thr Tyr Pro Phe Gln His Gln Pro Tyr Trp Leu Asp Ser Pro  
 885 890 895  
 Arg His Pro Ala Gly Asp Val Thr Gly Pro Gly Asp Asp Glu Phe Trp  
 900 905 910

Ala Ala Val Glu His Gly Glu Ala Thr Glu Leu Ala Asp Leu Leu Arg  
 915 920 925  
 Arg Ser Ala Ala Glu Pro Gly Gln Asp Leu His Ala Pro Val Ala Ala  
 930 935 940  
 Leu Leu Pro Thr Leu Ala Thr Trp Arg Arg Asp Arg Gln Arg Arg Ala  
 945 950 955 960  
 Ala Val Asp Ser Trp Arg Tyr Arg Ile Val Trp Arg Pro Val Ala Thr  
 965 970 975  
 Pro Ser Tyr Asp Arg Val Leu Ser Gly Arg Trp Ala Val Val Val Pro  
 980 985 990  
 Ala Gly His Glu Asp Asp Pro Val Val Asp Trp Val Cys Ser Ala Leu  
 995 1000 1005  
 Arg Asp His Gly Gly Glu Pro Glu Arg Met Val Leu Gly Pro Arg Glu  
 1010 1015 1020  
 Ser Arg Ser Ala Leu Ala Thr Arg Leu Ala Ala Asp Pro Pro Gly Gly  
 1025 1030 1035 1040  
 Val Val Ser Leu Leu Gly Leu Ser Gly Ala Ala His Pro Asp His Glu  
 1045 1050 1055  
 Val Leu Pro Ser Ala Val Ala Gly Thr Val Leu Leu Ala Gln Ala Leu  
 1060 1065 1070  
 Ser Asp Gly Ala Val Arg Ala Pro Val Trp Thr Leu Thr Arg Asn Gly  
 1075 1080 1085  
 Val Ser Ala Thr Ala Thr Asp Pro Val Ala Pro Thr His Ala Ala Gln  
 1090 1095 1100  
 Val Trp Ala Val Ala Arg Val Ala Gly Leu Glu His Pro Glu Ala Trp  
 1105 1110 1115 1120  
 Gly Gly Leu Leu Asp Leu Pro Asp Arg Leu Asp Asp Arg Ala Ala Ala  
 1125 1130 1135  
 Arg Phe Ala Ala Val Leu Ser Ala Gly Glu Asp Glu Asp Gln Leu Ala  
 1140 1145 1150  
 Leu Arg Asp Ala Gly Leu Leu Ala Arg Arg Leu Val Arg Ala Pro Val  
 1155 1160 1165  
 Pro Arg Asp Ala Val Thr Ala Gly Trp Gln Pro Arg Asp Thr Ala Leu  
 1170 1175 1180  
 Val Thr Gly Gly Thr Gly Gly Leu Gly Gly Gln Val Ala Arg Trp Leu  
 1185 1190 1195 1200  
 Ala Ala Ala Gly Val Arg His Leu Val Leu Val Ser Arg Arg Gly Ala  
 1205 1210 1215  
 Glu Ala Glu Gly Ala Asp Arg Leu Arg Asp Asp Leu Thr Ala Leu Gly  
 1220 1225 1230  
 Val Gln Val Thr Phe Gly Ala Cys Asp Val Ala Asp Arg Ala Ala Leu  
 1235 1240 1245  
 Ser Ala Leu Leu Asp Arg Val Gln Glu Asp Gly Pro Pro Ile Arg Thr

1250

1255

1260

Val Val His Ala Ala Gly Ser Gly Arg Ala Ala Arg Leu Leu Asp Thr  
 1265 1270 1275 1280  
 Asp Ala Glu Glu Thr Ala Ala Val Leu Arg Ala Lys Ser Ala Gly Ala  
 1285 1290 1295  
 Arg Asn Leu His Glu Leu Leu Asp Asp Val Asp Ala Phe Val Leu Phe  
 1300 1305 1310  
 Ser Ser Gly Ala Gly Val Trp Gly Ser Ser Ala Gln Gly Ala Tyr Ala  
 1315 1320 1325  
 Ala Ala Asn Ala Tyr Leu Asp Ala Leu Ala Glu Gln Arg Arg Gly Gln  
 1330 1335 1340  
 Gly Arg Pro Ala Thr Ser Val Ala Trp Gly Ala Trp Ala Gly Asp Gly  
 1345 1350 1355 1360  
 Met Thr Ala Ala Ala Gly Glu Glu Trp Trp Ser Arg Gln Gly Leu Arg  
 1365 1370 1375  
 Phe Met Ala Pro Glu Ala Ala Leu Asp Ala Leu Arg Gln Ala Val Asp  
 1380 1385 1390  
 Arg Ala Glu Ser Thr Leu Val Val Ala Asp Ile Asp Trp Lys Thr Phe  
 1395 1400 1405  
 Ala Pro Leu Phe Thr Ser Ala Arg Ser Arg Pro Leu Ile Thr Asp Ile  
 1410 1415 1420  
 Pro Glu Ala Arg Pro Glu Pro Arg Pro Glu Gly Ala Asp Gln Pro Thr  
 1425 1430 1435 1440  
 Gln Gly Leu Val Ala Lys Leu Ala Val Leu Ser Ala Asp Glu Arg Arg  
 1445 1450 1455  
 Arg Ala Leu Leu Ala Glu Val Arg Ala Gln Ala Ala Val Val Leu Gly  
 1460 1465 1470  
 His Pro Gly Ala Asp Ala Val Pro Val Asp Arg Pro Phe Arg Glu Leu  
 1475 1480 1485  
 Gly Phe Asp Ser Leu Ser Ala Val Lys Leu Arg Asn Arg Ile Val Ala  
 1490 1495 1500  
 Ala Thr Gly Leu Glu Leu Pro Ala Thr Leu Val Phe Asp His Pro Thr  
 1505 1510 1515 1520  
 Ser Thr Ala Leu Ala Ala Tyr Leu Gly Ala Arg Leu Gly Ile Asp Gly  
 1525 1530 1535  
 Ala Pro Ala Gly Ser Thr Leu Leu Glu Asp Leu Ala Arg Leu Glu Ser  
 1540 1545 1550  
 Thr Val Ala Thr Leu Thr Ala Ala Pro Leu Ala Glu Thr Val Pro Asp  
 1555 1560 1565  
 Ala Arg Asp Arg Ala Ala Leu Thr Thr Arg Leu Arg Ala Leu Leu Glu  
 1570 1575 1580  
 Arg Trp Asp Gln Ala Asp Gly Glu Asp Gln Ala Ala Ala Arg Glu Glu  
 1585 1590 1595 1600

Leu Asp Asp Leu Ser Asp Asp Asp Leu Phe Asp Phe Ile Asp Ala Lys  
                   1605                  1610                  1615

Phe Gly Arg Ser  
                   1620

<210> 6

<211> 2130

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 6

Met Gly Asp Glu Gln Lys Leu Arg Thr Tyr Leu Arg Arg Val Thr Ala  
   1                  5                  10                  15

Asp Leu Ala Asp Val Thr Glu Arg Leu Gln Arg Ala Glu Asp Lys Asn  
                   20                  25                  30

Ala Glu Pro Ile Ala Ile Val Gly Met Gly Cys Arg Tyr Pro Gly Gly  
                   35                  40                  45

Val Arg Ser Pro Glu Glu Phe Trp Asn Leu Leu Asp Glu Gly Val Asp  
                   50                  55                  60

Ala Val Ala Gly Phe Pro Glu Asp Arg Gly Trp Asp Leu Glu Asn Leu  
                   65                  70                  75                  80

Tyr Asp Pro Asp Pro Asp Glu Pro Gly Lys Cys Tyr Ala Arg Glu Gly  
                   85                  90                  95

Gly Phe Leu Tyr Asp Ala Gly Glu Phe Asp Ala Ala Phe Phe Gly Ile  
                   100                  105                  110

Ser Pro Arg Glu Ala Leu Ser Met Asp Pro Gln Gln Arg Leu Leu Leu  
                   115                  120                  125

Glu Cys Ser Trp Ser Ala Leu Glu Arg Ala Gly Ile Asp Pro Gly Ser  
                   130                  135                  140

Leu Arg Gly Lys Asp Val Gly Val Tyr Val Gly Ala Trp Asn Ser Asn  
                   145                  150                  155                  160

Tyr Gly Arg Gly Gly Gly Ala Glu Ser Ser Glu Gly His Leu Leu Thr  
                   165                  170                  175

Gly Asn Ala Ser Ser Val Val Ser Gly Arg Val Ala Tyr Val Leu Gly  
                   180                  185                  190

Leu Glu Gly Pro Ala Val Thr Ile Asp Thr Ala Cys Ser Ser Ser Leu  
                   195                  200                  205

Val Gly Leu His Leu Ala Ala Gln Ala Leu Arg Ser Gly Glu Cys Gly  
                   210                  215                  220

Leu Ala Leu Ala Gly Gly Val Thr Val Met Ser Thr Pro Leu Ser Leu  
                   225                  230                  235                  240

Val Ser Phe Ser Arg Gln Arg Gly Leu Ala Gln Asp Gly Arg Ser Lys  
                   245                  250                  255

Ala Phe Ser Ala Asp Ala Asp Gly Met Gly Met Ala Glu Gly Val Gly  
                   260                  265                  270

Val Leu Val Leu Glu Arg Leu Ser Glu Ala Arg Arg Asn Gly His Glu  
 275 280 285  
 Val Leu Ala Val Leu Arg Ser Ser Ala Val Asn Gln Asp Gly Ala Ser  
 290 295 300  
 Asn Gly Leu Ser Ala Pro Asn Gly Pro Ala Gln Gln Arg Val Ile Gln  
 305 310 315 320  
 Ser Ala Leu Thr Val Gly Arg Leu Ala Pro Ser Asp Ile Asp Val Val  
 325 330 335  
 Glu Ala His Gly Thr Gly Thr Ala Leu Gly Asp Pro Ile Glu Ala Gln  
 340 345 350  
 Ala Leu Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Asp Arg Pro Leu  
 355 360 365  
 Trp Leu Gly Ser Val Lys Ser Asn Ile Gly His Thr Gln Ala Ala Ala  
 370 375 380  
 Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Leu Arg Lys Gly Val  
 385 390 395 400  
 Leu Pro Arg Thr Leu His Val Asp Glu Pro Thr Gly Glu Val Asp Trp  
 405 410 415  
 Asp Ser Gly Ala Val Arg Leu Leu Thr Glu Ala Arg Glu Trp Pro Ser  
 420 425 430  
 Gly Glu Gly Arg Val Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser  
 435 440 445  
 Gly Thr Asn Ala His Val Ile Val Glu Glu Ala Pro Glu Glu Glu Pro  
 450 455 460  
 Arg Pro Glu Ala Pro Ser Val Asp Val Val Pro Trp Val Leu Ser Ala  
 465 470 475 480  
 Arg Ser Ala Glu Ala Leu Arg Glu Gln Ala Ala Arg Leu Ala Ser Val  
 485 490 495  
 Ala Gly Gly Leu Asn Val Val Asp Val Gly Trp Ser Leu Ala Ser Thr  
 500 505 510  
 Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Arg Asp Ser Glu  
 515 520 525  
 Glu Leu Val Ser Gly Leu Ser Ser Val Ser Gly Val Glu Val Gly Val  
 530 535 540  
 Gly Val Gly Ala Gly Gly Gly Val Val Leu Val Phe Ala Gly Gln Gly  
 545 550 555 560  
 Cys Gln Trp Val Gly Met Gly Arg Glu Leu Leu Gly Ser Ser Leu Val  
 565 570 575  
 Phe Ala Glu Ser Met Arg Glu Cys Ala Ala Ala Leu Ser Pro Phe Val  
 580 585 590  
 Asp Phe Ser Val Val Asp Val Leu Gly Ser Ala Gly Glu Leu Gly Arg  
 595 600 605  
 Val Glu Val Val Gln Pro Ala Leu Trp Ala Val Met Val Ser Leu Ala



610

615

620

Arg Val Trp Arg Ser Trp Gly Val Pro Val Ala Ala Val Val Gly His  
 625 630 635 640  
 Ser Gln Gly Glu Ile Ala Ala Ala Thr Val Ala Gly Ala Leu Ser Val  
 645 650 655  
 Gly Asp Ala Ala Arg Val Val Ala Leu Arg Ser Arg Leu Ile Ala Glu  
 660 665 670  
 Arg Leu Ser Gly Leu Gly Gly Met Val Ser Val Ala Leu Ser Arg Glu  
 675 680 685  
 Arg Val Val Ser Leu Ile Ala Gly Val Pro Gly Val Ser Val Ala Ala  
 690 695 700  
 Val Asn Gly Ser Ser Ser Thr Val Val Ser Gly Glu Ala Ala Gly Leu  
 705 710 715 720  
 Glu Arg Val Leu Ala Ala Cys Val Ser Ser Gly Val Arg Ala Arg Arg  
 725 730 735  
 Ile Asp Val Asp Tyr Ala Ser His Ser Val Gln Val Glu Leu Ile Arg  
 740 745 750  
 Glu Glu Leu Leu Gly Val Leu Asp Gly Ile Val Pro Arg Ser Gly Glu  
 755 760 765  
 Ile Pro Phe Val Ser Thr Val Thr Gly Glu Arg Ile Asp Thr Val Glu  
 770 775 780  
 Leu Gly Ala Glu Tyr Trp Tyr Arg Asn Leu Arg Gln Thr Val Glu Phe  
 785 790 795 800  
 Gln Ala Ser Val Gln Thr Leu Leu Ala Gln Gly His Gln Val Phe Leu  
 805 810 815  
 Glu Ser Ser Pro His Pro Val Leu Thr Val Gly Ile Glu Glu Thr Val  
 820 825 830  
 His Glu Ser Ala Ala Gln Ala Val Val Leu Gly Ser Leu Arg Arg Asp  
 835 840 845  
 Glu Gly Ala Leu Thr Arg Leu Val Thr Ser Ala Gly Glu Ala Trp Ala  
 850 855 860  
 Arg Gly Val Pro Val Asp Trp Ala Gly Met Leu Ala Gly Gly Arg Arg  
 865 870 875 880  
 Val Glu Leu Pro Thr Tyr Pro Phe Leu Arg Glu Arg Leu Trp Leu Glu  
 885 890 895  
 Pro Ser Arg Ser Arg Thr Gly Asn Leu Asn Met Ala Gly Leu Val Glu  
 900 905 910  
 Ala Gly His Glu Ile Leu Pro Ala Ala Val Glu Leu Pro Gly Glu Gln  
 915 920 925  
 Trp Val Trp Thr Gly Glu Leu Ser Leu Ser Ala Tyr Pro Trp Leu Ala  
 930 935 940  
 Asp His Gln Val Leu Gly Gln Thr Leu Val Pro Gly Val Ala Trp Val  
 945 950 955 960

Glu Leu Ala Leu His Ala Gly His Gln Leu Gly Phe Gly Ser Val Glu  
                                   965                                  970                                  975

Glu Leu Thr Leu Gln Ala Pro Leu Val Leu Gly Glu Ser Asp Ala Val  
                                   980                                  985                                  990

Gln Val Arg Val Val Val Ser Asp Leu Gly Glu Ser Asp Arg Arg Ala  
                                   995                                  1000                                  1005

Val Ser Val His Ser Arg Gly Asp Asp Gln Thr Trp Val Thr His Ala  
                                   1010                                  1015                                  1020

Glu Gly Phe Leu Thr Ala Lys Gly Ala Gln Pro Glu Thr Met Ala Val  
 1025                                  1030                                  1035                                  1040

Trp Pro Pro Ser Gly Ala Glu Pro Val Glu Ala Asp Gly Phe Tyr Glu  
                                   1045                                  1050                                  1055

Arg Leu Ala Asp Ala Gly Tyr His Tyr Gly Pro Val Phe Gln Gly Val  
                                   1060                                  1065                                  1070

Ser Lys Val Trp Arg Ala Gly Glu Glu Ile Tyr Ala Glu Val Gly Leu  
                                   1075                                  1080                                  1085

Leu Asp Asp Ala Asp Val Asp Gly Phe Gly Ile His Pro Ala Leu Leu  
                                   1090                                  1095                                  1100

Asp Ala Ala Leu Gln Thr Ala Tyr Val Ala Gln Arg Gly Pro Ala Glu  
 1105                                  1110                                  1115                                  1120

Thr Lys Leu Pro Phe Ala Phe Gly Asp Val Gln Leu Phe Ala Thr Gly  
                                   1125                                  1130                                  1135

Ala Arg Ser Leu Arg Val Arg Val Ser Pro Ala Ala Gln Gln Gly Met  
                                   1140                                  1145                                  1150

Ala Trp Glu Ala Trp Asp Pro Thr Gly Leu Pro Val Phe Ser Leu Gly  
                                   1155                                  1160                                  1165

Tyr Leu Ala Thr Arg Pro Val Asp Arg Gly Gln Leu Thr Val Lys Arg  
                                   1170                                  1175                                  1180

Pro Glu Ser Leu Phe Lys Val Ala Trp Asp Glu Thr Val Pro Val Val  
 1185                                  1190                                  1195                                  1200

Gly Asn Ala Thr Ala Ala His Gly Val Val Leu Gly Asp Asp Pro Phe  
                                   1205                                  1210                                  1215

Ala Leu Gly Ala Ala Leu Arg Ala Ala Gly Trp Glu Val Gly Ala Ala  
                                   1220                                  1225                                  1230

Pro Glu Pro Ala Ser Ala Asp Thr Ala Ala Glu Val Leu Leu Leu Pro  
                                   1235                                  1240                                  1245

Cys Thr Ala Pro Gly Glu Pro Asp Ala Asp Leu Pro Thr Ala Val Arg  
                                   1250                                  1255                                  1260

Ala Val Thr Ala Arg Val Leu Gly Val Leu Gln Glu Trp Leu Ala Asp  
 1265                                  1270                                  1275                                  1280

Glu Arg Leu Ala Gly Thr Arg Leu Ala Val Val Thr Arg Asn Ala Leu  
                                   1285                                  1290                                  1295

Pro Gly Asp Leu Leu His Ser Pro Val Trp Gly Leu Val Arg Ser Ala  
 1300 1305 1310  
 Gln Thr Glu Asn Pro Gly Arg Ile Thr Leu Val Asp Leu Asp Asp His  
 1315 1320 1325  
 Pro Asp Ser Ala Ala Val Leu Ala Glu Ala Val Gln Ser Asp Glu Pro  
 1330 1335 1340  
 Arg Ile Met Val Arg Glu Gly Arg Pro Thr Ala Ala Arg Leu Val Arg  
 1345 1350 1355 1360  
 Ala Thr Ala Pro Glu Leu Val Pro Pro Ala Gly Ala Asp Ala Trp Arg  
 1365 1370 1375  
 Leu Glu Ile Thr Glu Pro Gly Thr Phe Asp Asn Leu Thr Leu Gly Val  
 1380 1385 1390  
 Tyr Pro His Ala Glu Lys Thr Leu Ala Asp Asn Glu Val Arg Val Ala  
 1395 1400 1405  
 Val His Ala Gly Gly Leu Asn Phe His Asp Val Val Ala Ala Leu Gly  
 1410 1415 1420  
 Met Val Glu Asp Asp Leu Thr Leu Gly Arg Glu Ala Ala Gly Val Val  
 1425 1430 1435 1440  
 Val Glu Val Gly Asp Ala Val Pro Asp Leu Thr Pro Gly Asp His Val  
 1445 1450 1455  
 Met Gly Ile Leu Ser Ser Gly Phe Gly Pro Leu Ala Val Thr Asp His  
 1460 1465 1470  
 Arg Tyr Leu Ala Arg Met Pro Glu Gly Trp Thr Phe Ala Gln Ala Ala  
 1475 1480 1485  
 Ser Val Pro Ala Ala Phe Leu Thr Ala Tyr Tyr Gly Leu Cys Asp Leu  
 1490 1495 1500  
 Gly Gly Ile Arg Ala Gly Asp Arg Val Leu Ile His Ala Ala Ala Gly  
 1505 1510 1515 1520  
 Gly Val Gly Met Ala Ala Val Gln Ile Ala Arg His Leu Gly Ala Glu  
 1525 1530 1535  
 Val Phe Gly Thr Ala Ser Pro Arg Lys Trp Gly Ala Leu Arg Ala Leu  
 1540 1545 1550  
 Gly Leu Asp Asp Ala His Leu Ser Ser Ser Arg Thr Leu Asp Phe Glu  
 1555 1560 1565  
 Gln Glu Phe Leu Asp Ala Thr Asp Gly Arg Gly Val Asp Leu Val Leu  
 1570 1575 1580  
 Asn Ser Leu Ala Arg Glu Phe Val Asp Ala Ser Leu Arg Leu Met Pro  
 1585 1590 1595 1600  
 Gly Gly Gly Arg Phe Val Asp Met Gly Lys Thr Asp Ile Arg Arg Pro  
 1605 1610 1615  
 Glu Gln Val Ala Glu Asp His Gly Gly Val Ala Tyr Gln Ala Phe Asp  
 1620 1625 1630  
 Leu Val Glu Ala Gly Pro Gln Arg Thr Gly Glu Met Leu Ala Glu Ile

1635	1640	1645
Val Arg Leu Phe Gln Ala Gly Ala Phe Arg Pro Leu Pro Ile Thr Gln 1650	1655	1660
Trp Asp Val Arg Arg Ala Pro Glu Ala Phe Arg His Ile Ser Gln Ala 1665	1670	1675 1680
Lys His Ile Gly Lys Ile Val Leu Thr Val Pro Arg Pro Ile Asp Thr 1685	1690	1695
Asp Gly Thr Val Met Val Thr Gly Ala Thr Gly Thr Leu Gly Gly Phe 1700	1705	1710
Val Ala Arg His Leu Val Thr His His Gly Ile Arg Arg Leu Leu Leu 1715	1720	1725
Val Ser Arg Ser Ala Glu Arg Thr Asp Leu Val Arg Glu Leu Thr Glu 1730	1735	1740
Leu Gly Ala Asp Val Thr Trp Ala Ser Cys Asp Leu Ala Asp Ala Thr 1745	1750	1755 1760
Ala Val Glu Glu Thr Val Arg Ser Val Asp Glu Arg His Pro Leu Val 1765	1770	1775
Ala Val Val His Ser Ala Gly Val Leu Asp Asp Gly Val Ile Asp Lys 1780	1785	1790
Gln Ser Pro Glu Arg Leu Asp Thr Val Met Arg Pro Lys Val Asp Ala 1795	1800	1805
Ala Trp Asn Leu His Arg Leu Leu Asp Asn Ala Pro Leu Ala Asp Phe 1810	1815	1820
Val Leu Phe Ser Ser Ala Ser Gly Val Leu Gly Gly Ala Gly Gln Ser 1825	1830	1835 1840
Asn Tyr Ala Ala Ala Asn Ala Phe Leu Asp Ala Leu Ala Glu His Arg 1845	1850	1855
Arg Ala Gln Gly Leu Ala Gly Gln Ala Leu Ala Trp Gly Leu Trp Ser 1860	1865	1870
Asp Arg Ser Thr Met Thr Gly Gln Leu Gly Ser Thr Glu Leu Ala Arg 1875	1880	1885
Ile Ala Arg Asn Gly Val Ala Glu Met Ser Glu Thr Glu Gly Leu Ala 1890	1895	1900
Leu Phe Asp Ala Ala Arg Asp Thr Ala Glu Ala Val Leu Leu Pro Met 1905	1910	1915 1920
His Leu Asp Val Ala Arg Leu Arg Ser Arg Asn Gly Glu Val Pro Ala 1925	1930	1935
Val Phe Arg Arg Leu Ile His Ala Thr Ala Arg Arg Thr Ala Ser Thr 1940	1945	1950
Ala Val Arg Ser Ala Gly Leu Glu Gln Gln Leu Ala Ser Leu Ser Gly 1955	1960	1965
Pro Glu Arg Thr Glu Leu Leu Leu Gly Leu Val Arg Asp His Ala Ala 1970	1975	1980

Ala Val Leu Gly His Gly Thr Ser Asp Ala Val Ser Pro Asp Arg Pro  
1985 1990 1995 2000

Phe Arg Asp Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn  
2005 2010 2015

Arg Phe Ala Ala Leu Thr Gly Leu Arg Leu Pro Ala Thr Leu Val Phe  
2020 2025 2030

Asp His Pro Ser Pro Thr Ala Leu Ala Gly His Leu Ala Gly Leu Leu  
2035 2040 2045

Gly Ala Ala Thr Pro Ser Ala Ala Glu Pro Val Leu Ala Ala Val Gly  
2050 2055 2060

Arg Leu Arg Ala Asp Leu Arg Ser Leu Thr Pro Asp Ala Glu Gly Ala  
2065 2070 2075 2080

Glu Asp Val Thr Ile Gln Leu Glu Ala Leu Leu Ala Glu Trp Arg Glu  
2085 2090 2095

Ala Ala Glu Lys Arg Ala Pro Glu Ala Val Gly Asp Glu Asp Leu Ser  
2100 2105 2110

Thr Ala Thr Asp Asp Glu Ile Phe Ala Leu Val Asp Ser Glu Leu Gly  
2115 2120 2125

Glu Ala  
2130

<210> 7

<211> 1742

<212> PRT

<213> Streptomyces parvulus T4055

<400> 7

Met Thr Ala Glu Ala Ser Gln Asp Lys Leu Arg Asp Tyr Leu Arg Lys  
1 5 10 15

Thr Leu Ala Asp Leu Arg Thr Thr Lys Gln Arg Leu Arg Asp Thr Glu  
20 25 30

Arg Arg Ala Thr Glu Pro Val Ala Ile Val Gly Met Ser Cys Arg Leu  
35 40 45

Pro Gly Asp Val Arg Thr Pro Glu Arg Phe Trp Glu Leu Leu Asp Thr  
50 55 60

Gly Thr Asp Ala Leu Thr Pro Leu Pro Thr Asp Arg Gly Trp Asn Leu  
65 70 75 80

Asp Thr Ala Phe Asp Asp Glu Arg Pro Tyr Arg Arg Glu Gly Gly Phe  
85 90 95

Leu Tyr Asp Ala Gly Arg Phe Asp Ala Glu Phe Phe Gly Ile Ser Pro  
100 105 110

Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu Glu Ser  
115 120 125

Ser Trp Glu Ala Ile Glu His Ala Arg Ile Asp Pro Arg Ser Leu His  
130 135 140

Gly Ser Arg Thr Gly Val Trp Phe Gly Thr Ile Gly Gln Asp Tyr Phe  
 145 150 155 160  
 Ser Leu Phe Ala Ala Ser Gly Gly Glu His Ala Asn Tyr Leu Ala Thr  
 165 170 175  
 Ala Cys Ser Ala Ser Val Met Ser Gly Arg Val Ser Tyr Val Leu Gly  
 180 185 190  
 Leu Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser Leu  
 195 200 205  
 Val Ala Leu His Ser Ala Val Gln Ala Leu Arg Ser Gly Glu Cys Glu  
 210 215 220  
 Leu Ala Leu Ala Gly Gly Ala Thr Val Met Ala Thr Pro Thr Val Phe  
 225 230 235 240  
 Thr Ala Phe Ser His Gln Arg Gly Leu Ala Gly Asp Gly Arg Cys Lys  
 245 250 255  
 Ala Phe Ala Ala Gly Ala Asp Gly Ala Gly Phe Ala Glu Gly Val Gly  
 260 265 270  
 Val Leu Val Leu Glu Arg Leu Ser Val Ala Arg Arg Asn Gly His Arg  
 275 280 285  
 Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala Ser  
 290 295 300  
 Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val Ile Arg  
 305 310 315 320  
 Ala Ala Leu Ala Asn Ala Arg Leu Ala Pro Glu Asp Val Asp Ala Val  
 325 330 335  
 Glu Gly His Gly Thr Gly Thr Ser Leu Gly Asp Pro Ile Glu Ala Gln  
 340 345 350  
 Ala Leu Leu Ala Thr Tyr Gly Arg Gly Arg Asp Ala Glu Arg Pro Leu  
 355 360 365  
 Trp Leu Gly Ser Val Lys Ser Asn Ile Gly His Ala Gln Ala Ala Ala  
 370 375 380  
 Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Glu Lys Gly Arg  
 385 390 395 400  
 Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Gly Glu Val Asp Trp  
 405 410 415  
 Asp Ser Gly Ala Val Arg Leu Leu Thr Glu Ala Arg Asp Trp Pro Ser  
 420 425 430  
 Gly Glu Gly Arg Val Arg Arg Ala Gly Val Ser Ser Phe Gly Ile Ser  
 435 440 445  
 Gly Thr Asn Ala His Val Ile Ile Glu Glu Pro Gln Glu Glu Glu Ala  
 450 455 460  
 Ala Pro Asp Ser Ser Ala Ser Gly Ala Val Pro Trp Val Leu Ser Ala  
 465 470 475 480  
 Arg Ser Ala Glu Ala Leu Gln Ala Leu Ala Ser Gln Leu Ala Asp His

485

490

495

Ser Ala Lys Ser Ser Pro Val Asp Val Gly Trp Ser Leu Val Ser Thr  
 500 505 510  
 Arg Ala Ala Phe Glu His Arg Ala Val Val Val Gly Arg Gly Arg Asp  
 515 520 525  
 Glu Leu Val Arg Gly Leu Ser Glu Val Ala Gln Gly Arg Gly Val Arg  
 530 535 540  
 Gly Val Ala Ser Ser Ala Ser Gly Gly Leu Ala Phe Val Phe Ala Gly  
 545 550 555 560  
 Gln Gly Ser Gln Arg Leu Gly Met Gly Arg Gly Leu Tyr Glu Arg Phe  
 565 570 575  
 Pro Val Phe Ala Glu Ala Phe Asp Glu Val Cys Gly Arg Val Gly Pro  
 580 585 590  
 Gly Val Arg Glu Val Val Phe Gly Ser Asp Ala Gly Glu Leu Asp Arg  
 595 600 605  
 Thr Val Trp Ala Gln Ala Gly Leu Phe Ala Leu Glu Val Ala Leu Phe  
 610 615 620  
 Arg Leu Leu Glu Ser Trp Gly Val Arg Pro Gly Cys Leu Ile Gly His  
 625 630 635 640  
 Ser Val Gly Glu Leu Ser Ala Ala Cys Val Ala Gly Leu Trp Ser Leu  
 645 650 655  
 Glu Asp Ala Cys Arg Val Val Ala Ala Arg Ala Arg Leu Met Gln Ala  
 660 665 670  
 Leu Pro Ala Gly Gly Val Met Val Ala Val Arg Ala Glu Ala Gly Glu  
 675 680 685  
 Leu Ala Gly Phe Leu Gly Glu Asp Val Val Ile Ala Ser Val Asn Ala  
 690 695 700  
 Pro Gly Gln Val Val Ile Ala Gly Pro Glu Gly Gly Val Glu Arg Val  
 705 710 715 720  
 Val Ala Ala Cys Gly Ala Arg Ser Arg Arg Leu Ala Val Ser His Ala  
 725 730 735  
 Phe His Ser Pro Leu Val Glu Pro Met Leu Gly Glu Phe Arg Arg Val  
 740 745 750  
 Val Glu Ser Val Ala Phe Gly Val Pro Ser Leu Arg Val Val Ser Asn  
 755 760 765  
 Val Thr Gly Ala Trp Val Asp Pro Glu Glu Trp Gly Thr Pro Glu Tyr  
 770 775 780  
 Trp Val Arg Gln Val Arg Glu Pro Val Arg Phe Ala Asp Gly Val Ala  
 785 790 795 800  
 Thr Leu Leu Asp Ala Gly Val Arg Thr Phe Val Glu Leu Gly Pro Ala  
 805 810 815  
 Gly Thr Leu Thr Ser Met Val Ser His Cys Ala Asp Ala Thr Ala Thr  
 820 825 830

Ser Val Thr Ala Val Pro Thr Leu Arg Pro Asp His Asp Glu Ser Arg  
 835 840 845  
 Thr Val Leu Ser Ala Ala Ala Ser Leu Tyr Val Gln Gly His Pro Val  
 850 855 860  
 Asp Trp Ala Pro Leu Phe Pro Arg Ala Arg Thr Val Asp Leu Pro Thr  
 865 870 875 880  
 Tyr Pro Phe Gln His Gln His Tyr Trp Met Glu Ser Ala Ala Arg Pro  
 885 890 895  
 Thr Val Glu Asp Thr Pro Arg Glu Pro Leu Asp Gly Trp Thr His Arg  
 900 905 910  
 Ile Asp Trp Val Pro Leu Val Asp Glu Glu Pro Ala Pro Val Leu Ala  
 915 920 925  
 Gly Thr Trp Leu Leu Val Arg Pro Glu Glu Gly Pro Arg Pro Leu Ala  
 930 935 940  
 Asp Ala Val Ala Asp Ala Leu Thr Arg His Gly Ala Ser Val Val Glu  
 945 950 955 960  
 Ala Ala Arg Val Pro His Gln Ser Asp Thr Glu Leu Thr Gly Val Val  
 965 970 975  
 Ser Leu Leu Gly Pro Gly Ala Asp Gly Asp Gly Gly Leu Asp Ala Thr  
 980 985 990  
 Leu Arg Leu Val Gln Asp Leu Ala Thr Ala Gly Ser Thr Ala Pro Leu  
 995 1000 1005  
 Trp Ile Val Thr Ser Gly Ala Val Ala Val Gly Thr Ser Asp Thr Val  
 1010 1015 1020  
 Pro Asn Pro Glu Gln Ala Thr Leu Trp Gly Leu Ala Arg Ala Ala Ala  
 1025 1030 1035 1040  
 Thr Glu Trp Pro Gly Leu Gly Ala Ala Arg Ile Asp Leu Pro Ala Asp  
 1045 1050 1055  
 Leu Thr Glu Gln Val Gly Arg Arg Leu Cys Ala Arg Leu Leu Asp Arg  
 1060 1065 1070  
 Ser Glu Gln Glu Thr Ala Val Arg Gln Ala Gly Val Phe Ala Arg Arg  
 1075 1080 1085  
 Leu Val Arg Ala Arg Thr Ser Asp Gly Arg Trp Thr Pro Arg Gly Thr  
 1090 1095 1100  
 Val Leu Val Thr Gly Gly Thr Gly Ala Leu Ala Gly His Val Ala Arg  
 1105 1110 1115 1120  
 Trp Leu Ala Glu Glu Gly Ala Glu His Ile Val Leu Ala Gly Arg Arg  
 1125 1130 1135  
 Gly Pro Asp Gly Gln Gly Ala Glu Ala Leu Arg Ala Asp Leu Val Ala  
 1140 1145 1150  
 Ala Gly Val Lys Ala Thr Ile Val Arg Cys Asp Val Ala Asp Arg Asp  
 1155 1160 1165



Ala Val Arg Leu Leu Leu Asp Ala His Arg Pro Ser Ala Ile Val His  
 1170 1175 1180  
 Thr Ala Gly Val Val Asp Asp Gly Leu Leu Thr Ser Leu Thr Pro Ala  
 1185 1190 1195 1200  
 Gln Val Glu Arg Val Leu Arg Pro Lys Leu Leu Gly Ala Arg Asn Leu  
 1205 1210 1215  
 His Glu Leu Thr Arg Asp Arg Glu Leu Asp Ala Phe Val Leu Phe Ser  
 1220 1225 1230  
 Ser Leu Ala Gly Val Leu Gly Gly Ala Gly Gln Ala Asn Tyr Ala Ala  
 1235 1240 1245  
 Ala Asn Ala Tyr Leu Asp Ala Leu Ala Ala His Arg Thr Ala His Gly  
 1250 1255 1260  
 Leu Pro Ala Ala Ser Leu Ala Trp Gly Pro Trp Glu Gly Asp Gly Met  
 1265 1270 1275 1280  
 Ala Ala Ala Gln Glu Ala Ala Asp Arg Leu Arg Arg Ser Gly Leu Thr  
 1285 1290 1295  
 Pro Leu Pro Pro Glu Gln Ala Val Arg Ala Leu Gly Arg Gly His Gly  
 1300 1305 1310  
 Pro Leu Val Val Ala Asp Ala Asp Trp Ala Arg Leu Ala Ala Gly Ser  
 1315 1320 1325  
 Thr Gln Arg Leu Leu Asp Glu Leu Pro Glu Val Arg Ala Val Arg Pro  
 1330 1335 1340  
 Ala Glu Pro Ala Val Gly Gln Arg Pro Asp Leu Pro Ala Arg Leu Ala  
 1345 1350 1355 1360  
 Gly Arg Pro Ala Glu Glu Gln Ser Ala Val Leu Leu Glu Ala Val Arg  
 1365 1370 1375  
 Glu Glu Ile Ala Ala Val Leu Arg Tyr Ala Asp Pro Ala Arg Ile Gly  
 1380 1385 1390  
 Ala Asp His Glu Phe Leu Ala Leu Gly Phe Asp Ser Leu Thr Ser Ile  
 1395 1400 1405  
 Glu Leu Arg Asn Arg Leu Ala Thr Arg Ile Gly Leu Thr Leu Pro Ala  
 1410 1415 1420  
 Thr Leu Thr Leu Glu Gln Arg Thr Pro Ala Gly Leu Ala Ala His Leu  
 1425 1430 1435 1440  
 Arg Glu Arg Ile Ala Asp Arg Pro Val Gly Ser Gly Ala Val Pro Val  
 1445 1450 1455  
 Pro Gly Ser Ala Asp Val Pro Glu Ala Gly Gly Gly Ser Gly Leu Gly  
 1460 1465 1470  
 Glu Leu Trp Gln Glu Ala Asp Arg His Gly Arg Arg Leu Glu Phe Ile  
 1475 1480 1485  
 Asp Val Leu Thr Ala Ala Ala Ala Phe Arg Pro Ala Tyr Arg Glu Pro  
 1490 1495 1500  
 Ala Glu Leu Glu Leu Pro Pro Leu Arg Leu Thr Ser Gly Gly Asp Glu

1505                      1510                      1515                      1520  
 Pro Pro Leu Phe Cys Ile Pro Ser His Leu Gly Lys Ala Asp Pro His  
                                  1525                      1530                      1535  
 Lys Phe Leu Arg Phe Ala Ala Ala Leu Arg Gly Arg Arg Asp Val Phe  
                                  1540                      1545                      1550  
 Val Leu Arg Gln Pro Gly Phe Val Pro Gly Gln Pro Leu Pro Ala Gly  
                                  1555                      1560                      1565  
 Leu Asp Val Leu Leu Asp Thr His Ala Arg Ala Met Ala Gly His Asp  
                                  1570                      1575                      1580  
 Arg Pro Val Leu Leu Gly Tyr Ser Ala Gly Gly Leu Ala Ala Gln Ala  
 1585                      1590                      1595                      1600  
 Leu Ala Ala Arg Leu Ala Glu Leu Gly Arg Pro Pro Ala Ala Val Val  
                                  1605                      1610                      1615  
 Leu Val Asp Thr Tyr Ala Pro Asp Glu Thr Glu Val Met Ala Arg Ile  
                                  1620                      1625                      1630  
 Gln Gly Ala Met Glu Gln Gly Gln Arg Asp Arg Asp Gly Arg Thr Gly  
                                  1635                      1640                      1645  
 Ala Ala Phe Gly Glu Ala Trp Leu Thr Ala Met Gly His Tyr Phe Gly  
                                  1650                      1655                      1660  
 Phe Asp Trp Thr Pro Cys Pro Val Asp Val Pro Val Leu His Val Arg  
 1665                      1670                      1675                      1680  
 Ala Gly Asp Pro Met Thr Gly Met Pro Val Glu Gly Arg Trp Gln Ala  
                                  1685                      1690                      1695  
 Arg Trp Asn Leu Pro His Thr Ala Val Asp Val Pro Gly Asp His Phe  
                                  1700                      1705                      1710  
 Thr Met Met Glu Asp His Ala Pro Arg Thr Ala Asp Thr Val His Asp  
                                  1715                      1720                      1725  
 Trp Leu Gly Thr Ala Val Arg Arg Pro Glu Arg Thr Arg Asp  
                                  1730                      1735                      1740  
  
 <210> 8  
 <211> 264  
 <212> PRT  
 <213> Streptomyces parvulus TU4055  
  
 <400> 8  
 Met Thr Gly Thr Asn Thr His Ser Asp Val Trp Ile Arg Gln Tyr Arg  
 1                      5                      10                      15  
 Pro Ala His Pro Thr Ala Pro Gln Leu Ile Cys Leu Pro His Ala Gly  
                                  20                      25                      30  
 Gly Ser Ala Thr Phe Tyr His Pro Val Ala Ala Ala Leu Ala Pro Arg  
                                  35                      40                      45  
 Cys Asp Val Leu Ala Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg Ala  
                                  50                      55                      60  
 Glu Lys Pro Leu Glu Asp Ile Asp Glu Leu Ala Asn Gln Leu Phe Pro  
                                  65                      70                      75                      80

Val Leu Arg Ala Arg Val His Gln Pro Val Ala Leu Phe Gly His Ser  
85 90 95

Met Gly Ala Thr Leu Ala Phe Glu Leu Ala Arg Arg Phe Glu Ser Ala  
100 105 110

Gly Ile Ser Leu Glu Ala Leu Leu Val Ser Ala Arg Pro Ala Pro Ser  
115 120 125

Arg Gln Arg Thr Gly Gly Thr Val His Leu Leu Ser Asp Glu Glu Leu  
130 135 140

Val Ala Glu Leu Arg Thr Leu Asp Gly Thr Ala Glu Gln Val Phe His  
145 150 155 160

Asp Glu Glu Leu Val Arg Met Ala Leu Pro Ala Ile Arg Gly Asp Tyr  
165 170 175

Arg Ala Ala Glu Thr Tyr Arg Tyr Arg Pro Gly Pro Lys Leu Arg Cys  
180 185 190

Pro Ile His Ala Leu Thr Gly Asp Asp Asp Pro Met Val Thr Pro Val  
195 200 205

Glu Ala Arg Ala Trp Ser Glu His Thr Asp Gly Pro Phe Thr Leu Asp  
210 215 220

Thr Phe Ala Gly Gly His Phe Tyr Leu Leu Glu His Arg Asp Ala Ile  
225 230 235 240

Leu Gly Ile Ile Ala Glu His Leu Arg Thr Cys Ser Arg Ala Pro Gly  
245 250 255

Asp Arg Ser Gly Leu Thr Arg Glu  
260

<210> 9  
<211> 265  
<212> PRT  
<213> Streptomyces parvulus Tü4055

<400> 9  
Met Ser Leu Glu Leu Thr Asp Arg Val Met Met Val Thr Gly Ala Gly  
1 5 10 15

Ser Gly Ile Gly Arg Ala Ala Ala Arg Leu Leu Val Gly His Gly Ala  
20 25 30

Arg Val Val Leu Val Gly Arg Thr Glu Ser Ala Leu Thr Glu Thr Thr  
35 40 45

Ala Gly Leu Pro Ser Ser His His Leu Val Val Pro Cys Asp Val Gly  
50 55 60

Asp Asp Lys Gln Val Ala Asp Cys Val Ala Arg Ala Val Ser Arg Phe  
65 70 75 80

Gly Arg Leu Asp Gly Ala Phe Asn Asn Ala Gly Thr Phe Gly Ser Phe  
85 90 95

Gly Pro Leu His Gln Asp Thr Ala Asp Asn Phe Asp Arg Val Ile Ala  
100 105 110

Thr Asn Leu Arg Gly Val Trp Ser Cys Met Arg Gly Gln Ile Glu Ala  
 115 120 125  
 Met Leu Thr Ala Gly Gly Gly Ala Ile Val Asn Cys Ala Ser Val Ala  
 130 135 140  
 Gly His Ile Gly His Ala Gln Ser Pro Leu Tyr Ser Ala Thr Lys His  
 145 150 155 160  
 Ala Val Ile Gly Leu Ser Lys Ser Val Ala Leu Gln Tyr Ala Gly Asp  
 165 170 175  
 Gly Ile Arg Val Asn Val Val Ser Pro Gly Ser Thr Asp Thr Pro Met  
 180 185 190  
 Leu Arg Ser Leu Tyr Ala Asp Pro Ser Ala Leu Ala Gln Arg Ala Arg  
 195 200 205  
 Arg Ala Pro Leu Gly Arg Leu Gly Lys Cys Glu Glu Val Ala Asn Ala  
 210 215 220  
 Val Val Trp Leu Leu Ser Pro Leu Ala Ala Tyr Val Thr Gly Gln Thr  
 225 230 235 240  
 Leu Gly Val Asp Gly Gly Val Thr Ala Gly Ser Ala Ile Pro Arg Thr  
 245 250 255  
 Asn Ala Thr Pro Glu Gly Gln His Arg  
 260 265  
 <210> 10  
 <211> 250  
 <212> PRT  
 <213> Streptomyces parvulus Tü4055  
 <400> 10  
 Met Thr Ala Arg His Asp Val Ala Leu Val Thr Gly Ala Gly Ser Gly  
 1 5 10 15  
 Ile Cys Ala Glu Val Ala Arg Gly Leu Ala Ala Arg Gly Leu Arg Val  
 20 25 30  
 Val Leu Leu Asp Lys Asp Ala Glu Ala Val His Arg Val Ala Asp Gly  
 35 40 45  
 Leu Gly Asp Arg Leu Ala Arg Asp Pro Leu Val Ala Asp Val Thr Asp  
 50 55 60  
 Pro His Ala Leu Ala Ser Ala Val Asp Ser Leu Ala Pro Gln His Arg  
 65 70 75 80  
 Pro Gly Val Leu Val Asn Gly Val Gly Gly Asp Thr Arg Ala Arg Ser  
 85 90 95  
 Val Thr Glu Leu Thr Glu Ala Asp Leu Gln Glu Ala Val Thr His Asn  
 100 105 110  
 Leu Ala Ser Val Phe Thr Met Thr Arg Leu Cys Val Pro Ala Met Val  
 115 120 125  
 Ala Ala Gly Trp Gly Arg Val Val Asn Leu Ala Ser Val Ala Gly Arg  
 130 135 140  
 Thr Tyr Thr Arg Phe Ser Asn Ala Ala Tyr Val Ala Ala Lys Ala Gly

77

Glu Glu Ala Glu Lys Val Ala Gly Glu Leu Asp Gly Val Gly Trp Val  
 210 215 220  
 Glu Glu Pro Leu Pro Pro Arg Ser Trp Pro Glu Leu Gly Arg Leu Arg  
 225 230 235 240  
 Arg Ala Thr Gly Leu Pro Val Met Leu Asp Glu Ser Cys Thr Gly Pro  
 245 250 255  
 Ala Asp Leu His Ala Ala Ala Thr Ser Gly Ala Ala Ser His Ile Asn  
 260 265 270  
 Val Arg Leu Ser Lys Cys Gly Gly Phe Leu Ala Ala Arg Leu Ala  
 275 280 285  
 Leu Arg Ala Asp Glu Leu Gly Val Gly Cys Gln Leu Gly Val His Val  
 290 295 300  
 Ala Glu Val Gly Pro Leu Trp Ala Ala Gly Arg Thr Leu Ala Thr Ala  
 305 310 315 320  
 Trp Asp Leu Trp Gln Thr Val Glu Ala Gly Arg Ala Asp Glu Trp Phe  
 325 330 335  
 Pro Val Pro Leu Thr Thr Pro Ala Phe Thr Val Asp Arg Ser Leu His  
 340 345 350  
 Arg Val Glu Pro Leu Thr Gly Pro Gly Thr Gly Ile Glu Pro Thr Glu  
 355 360 365  
 Glu Leu Leu Arg His Thr Arg Cys Ala Ala Thr Trp Glu Ser Gly Gly  
 370 375 380  
 Gly Trp Arg Arg Asn Thr  
 385 390  
 <210> 12  
 <211> 272  
 <212> PRT  
 <213> Streptomyces parvulus T4055  
 <400> 12  
 Met Pro Thr Thr Ser Met Leu Thr Ala Ala Asp Gly Thr Gly Leu Thr  
 1 5 10 15  
 Leu His His Trp Thr Thr Pro Gly Ala Thr Ser Ala Val Phe Tyr Leu  
 20 25 30  
 His Gly Ile Gln Ser His Ala Gly Trp Leu Phe Glu Thr Gly Pro Glu  
 35 40 45  
 Leu Asn Ala Arg Gly Ile Asp Val Tyr Ala Leu Asp Arg Arg Gly Ser  
 50 55 60  
 Gly Arg Ser Glu Gly Pro Arg Gly His Leu Pro Ser Ala Asp Leu Val  
 65 70 75 80  
 Leu Asp Asp Tyr Ala Arg Ala Leu Asp Ala Val Thr Ala Glu Val Gly  
 85 90 95  
 Gly Ala Gly Pro Val Ala Leu Gly Gln Ser Leu Gly Gly Ser Val Leu  
 100 105 110

Ala Ala Leu Trp Cys Thr Arg Asp Leu Pro Val Arg Arg Leu Val Leu  
 115 120 125

Cys Ala Pro Ala Leu Gly Gln Gln Arg Ala Arg His Thr Ala Asp Thr  
 130 135 140

Leu Ala Glu Arg Arg Ala Leu Thr Gly Ser Gly Leu Arg Pro Val Gly  
 145 150 155 160

Leu Ala Asp Gly Asp Tyr Thr Asp Leu Pro Arg Tyr Arg Glu Phe Leu  
 165 170 175

Thr Gly Asp His Leu Met Leu Arg Glu Val Thr Ser Ala Thr Gln Ala  
 180 185 190

Thr Leu Val His Leu Glu Asp His Tyr Ala Arg Gly Ala Pro Arg Thr  
 195 200 205

Arg Leu Pro Val Asp Leu Ala Leu Pro Thr His Asp Pro Ile Ile Asp  
 210 215 220

Leu Ser Ala Ala Arg Ala Met Leu Arg Arg Leu Thr Ser Ala Val His  
 225 230 235 240

Glu Glu Val Phe Ala Thr Asp Arg His Tyr Val Glu Phe Thr Ser Ala  
 245 250 255

Arg Thr Ala Tyr Trp Asp Trp Leu Ala Thr Arg Leu Lys Glu Glu Ala  
 260 265 270

<210> 13

<211> 539

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 13

Met Lys Val Phe His Ala Leu Ala Asp Ala Leu Thr Ala His Gly Val  
 1 5 10 15

Asp Thr Val Phe Gly Leu Met Gly Asn Ala Asn Leu Leu Tyr Leu Pro  
 20 25 30

Ala Phe Ala Asp Ala Gly Gly Arg Phe Val Ala Val Ala His Glu Ala  
 35 40 45

Gly Ala Val Ala Met Ala Asp Gly Arg Ala Arg Met Cys Gly Gly Ile  
 50 55 60

Gly Val Ala Ser Val Thr His Gly Pro Ala Phe Thr Asn Ala Leu Thr  
 65 70 75 80

Pro Leu Val Glu Ala Ala Arg Ser His Ser Gln Val Leu Leu Ile Thr  
 85 90 95

Gly Asp Pro Pro Pro Val Pro Thr His Phe His His Phe Asp Ile Ala  
 100 105 110

Thr Val Ala Ala Ala Ala Gly Ala Gly Tyr Glu Arg Val His Arg Pro  
 115 120 125

Ala Ser Leu Val Ala Asp Leu Asn Arg Ala Val Gln Arg Ile Val Ala  
 130 135 140

Glu Arg Arg Pro Val Val Leu Asn Val Pro Ile Asp Leu Met Gln Ala

145		150		155		160
Glu Ala Gly Glu Gln Ala Pro Val Thr Leu Pro Val Ala Pro Gly Pro						
	165			170		175
Leu Ala Ala Pro Glu Ala Glu Ala Leu Asp Gly Ala Leu Gly Leu Ile						
	180			185		190
Gly Ser Ala Lys Arg Pro Leu Val Leu Ala Gly His Gly Ala Ala Val						
	195			200		205
Ala Gly Ala Arg Glu Ala Leu Val Glu Leu Ala Asp Arg Thr Gly Ala						
	210			215		220
Ala Leu Ala Thr Thr Val Leu Gly Lys Glu Met Phe Ala Gly His Pro						
	225			230		235
Arg Asp Val Gly Ile Phe Gly Ser Leu Ala His Ser Val Ala Ser Thr						
	245			250		255
Val Ile Ala Glu Ser Asp Cys Val Ile Ala Phe Gly Ala Ser Leu Asn						
	260			265		270
Met Trp Thr Val Leu Asn Gly Glu Leu Leu Arg Gly Lys Arg Val Val						
	275			280		285
His Val Asp Thr Asp Pro Ala Arg Phe Gly Ser Tyr Ser Pro Val Asp						
	290			295		300
Glu Pro Val Ala Gly Asp Ala Arg Arg Thr Ala Glu Thr Met Asn Val						
	305			310		315
Leu Leu Asp Gln Ala Gly Val Thr Ala Ala Asn Gly Ala Trp Ala Glu						
	325			330		335
Arg Val Ala Gly Gln Leu Ala Gly Phe Ser Pro Gln Asp Asp Val Asp						
	340			345		350
Asp Arg Ser Gly Ala Glu Thr Val Asp Ile Arg Thr Ala Met Ile Arg						
	355			360		365
Leu Asp Arg Ile Leu Pro Ala Glu Arg Ser Val Val Ser Asp Ile Gly						
	370			375		380
Arg Phe Asp Val Gly Val Trp Pro Tyr Leu Arg Val Ala Asp Pro Leu						
	385			390		395
His Phe Thr Val Met Gly Gly Phe Gly Ser Ile Gly Leu Gly Val Ala						
	405			410		415
Gly Ala Ile Gly Ala Ala Thr Ala Gly Thr Gly Arg Pro Val Val Ala						
	420			425		430
Ala Val Gly Asp Gly Gly Phe Met Met His Leu Ser Glu Phe Thr Thr						
	435			440		445
Ala Val Arg Tyr Arg Leu Pro Leu Val Val Val Val Leu Asn Asp Gly						
	450			455		460
Ala Tyr Gly Ala Glu His Tyr Lys Leu Arg Asn His Gly Tyr Asp Pro						
	465			470		475
Ala Tyr Ser Ala Phe Ala Trp Pro Asp Leu Ala Gly Leu Ala Thr Ala						
	485			490		495



Met Gly Ala Arg Ala Leu Thr Val Arg Lys Ala Glu Glu Leu Asp Ala  
500 505 510

Val Gly Asp Leu Leu Ser Thr Leu Glu Gly Pro Leu Leu Val Asp Val  
515 520 525

Arg Leu Asp Pro Asp Val Asn Leu Val Arg Tyr  
530 535

<210> 14

<211> 683

<212> PRT

<213> Streptomyces parvulus T04055

<400> 14

Met Arg Gly Ala Arg Glu Asn Ser Met Thr Arg Ala Gly Pro Leu Glu  
1 5 10 15

Gly Ile Ala Val Leu Met Ala Gly Arg Ser Thr Pro Ala Ala Leu Leu  
20 25 30

Gly Arg Leu Leu Ala Asp Leu Gly Ala Arg Val Val Thr Leu Cys Arg  
35 40 45

Ser Pro Asp His Gly Gly Pro Phe Glu Arg Trp Leu His Ser Ala Ala  
50 55 60

Gln Ser Ala Ser Gly Trp Asp Gln Ala Ser Arg Leu Leu Gln Thr Ala  
65 70 75 80

Asp Val Leu Val Cys Asp Ala Glu Gly Asp Glu Arg Leu Ala Ala Leu  
85 90 95

Gly Leu Gly Ala Pro Glu Leu Pro His Arg Ser Pro Glu Leu Val Ala  
100 105 110

Val Arg Leu Ser Ala Phe Gly Leu Thr Gly Pro Leu Arg Asp Ala Pro  
115 120 125

Ala Thr Glu Arg Thr Leu Gln Ala Leu Ala Gly Leu Thr Ser Ala Thr  
130 135 140

Gly Thr Glu Gly Glu Pro Ser Val Leu Ser Val Val Gly Leu Ala Ser  
145 150 155 160

Arg Thr Ala Ala Leu Ser Gly Leu Ile Ala Val Val Ala Gly Leu Ile  
165 170 175

Gly Arg Glu Arg Gly Gly Gly Gly Asp Tyr Leu Asp Ile Ala Glu Phe  
180 185 190

Asp Ser Leu Phe Thr Leu Thr Gly Thr Leu Leu Pro Ser Val Ala Leu  
195 200 205

Ala Gly Arg Pro Pro Arg Arg Thr Gly Asn Arg His Gly Met Ala Ala  
210 215 220

Pro Trp Asn Ser Tyr Thr Cys Gln Asp Ala Pro Val Val Ile Cys Thr  
225 230 235 240

Met Gly Glu Pro Ile Trp His Arg Leu Thr Ala Val Leu Gly Arg Arg  
245 250 255

Asp Leu Pro Asp Asp Pro Arg Phe Ala Asp Thr Ala Ala Arg Val Arg  
 260 265 270  
 Asn Ala Asp Glu Leu Asp Glu Ile Leu Gly Lys Trp Thr Ala Gly Gln  
 275 280 285  
 Arg Ala Val Asp Val Val Thr Ala Leu Arg Ala Ala Gly Ile Pro Cys  
 290 295 300  
 Ala Gln Val Ala Ala Pro Glu Glu Val Arg Asp Gly Ala Ala Ala Arg  
 305 310 315 320  
 Arg Arg Gly Leu Val Thr Asp Pro Ser Gly Thr Pro Gly Ser Pro Leu  
 325 330 335  
 Arg Ser Leu Ile Pro Ala Val Thr Asp Gly Pro Met Pro Arg Gln Gly  
 340 345 350  
 Gly Leu Trp Glu Pro Ile Ala Arg Gly Thr Pro Pro Leu Arg Gly Val  
 355 360 365  
 Arg Leu Leu Glu Val Gly Ser Tyr Thr Ala Gly Pro His Ala Gly Arg  
 370 375 380  
 Leu Leu Ala Gln Leu Gly Ala Asp Val Leu Lys Val Glu Pro Pro His  
 385 390 395 400  
 Gly Glu Gly Ser Arg Arg Leu Ala Gln Gln Val Ala Gly Val Gly Tyr  
 405 410 415  
 Leu Tyr Tyr Val Asn Asn Ala Gly Lys Arg Ser Cys Arg Leu Asp Leu  
 420 425 430  
 Ala Asp Ala Glu Asp Arg Ala Gly Phe Glu Arg Leu Leu Ala Gly Cys  
 435 440 445  
 Asp Ile Val Leu Thr Asn Leu Ala Ala Asp Thr Leu Thr Ala Gln Gly  
 450 455 460  
 Leu Ala Pro Asp Gln Ile Leu Ser Arg His Gly Val Val His Cys Thr  
 465 470 475 480  
 Val Thr Gly His Gly Leu Ala Ala Ala Asp Arg Ser Val Asp Thr Val  
 485 490 495  
 Ile Gln Ala Glu Ser Gly Ile Met Arg Leu Val Gly Gly Pro Gly Ala  
 500 505 510  
 Gly Leu Arg Thr Pro Val Ser Ser Ala Asp Val Leu Gly Ala Tyr Leu  
 515 520 525  
 Ala Ala Ala Ala Ala Val Val Ser Thr Tyr Val Arg Leu Arg Thr Glu  
 530 535 540  
 His Gly Cys Ala Ala Asp Val Ala Leu Phe Asp Ser Ala Val Trp Leu  
 545 550 555 560  
 Thr Gln Asp Arg Trp Phe Thr Ala Pro Pro Ala Arg Ala Pro His Leu  
 565 570 575  
 Val Arg Ala Ala Asp Gly Thr Val Leu Val Asp Ala Glu Gly Pro Pro  
 580 585 590  
 Pro Arg Ala Glu Gly Pro Val Ala Ala Val Leu Asp Ala Ala Ala

595

600

605

Val Gly Val Pro Ala Ala Pro Leu His Asp Leu Thr Arg Ala Val Arg  
 610 615 620

His Pro Gln Val Leu Ala Arg Arg Met Ala Val Ala Arg Asp Cys Ala  
 625 630 635 640

Gly Thr Thr Val Leu Ile Thr Gly Asn His Leu Arg Ser Leu Leu Arg  
 645 650 655

Glu Asp Pro Pro Pro Thr Cys Ala Pro Val Asp Gln Asn Asp Pro Val  
 660 665 670

Trp Leu Gln Pro Ala Pro Thr Glu Gly Gln Gln  
 675 680

&lt;210&gt; 15

&lt;211&gt; 426

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 15

Met Thr Thr Arg Arg Arg Gln Arg His Pro Ala Leu Ser Pro Ser Cys  
 1 5 10 15

Pro Ser Val Pro Phe Pro Leu Leu Glu Thr Glu Phe Val Leu Met Pro  
 20 25 30

Ser Phe Pro Val Arg Arg Ser Val Pro Asp Thr Pro Pro Ala Glu His  
 35 40 45

Leu Glu Leu Leu Lys Glu Ser Gly Gly Val Cys Pro Phe Thr Met Glu  
 50 55 60

Asp Gly Arg Pro Ala Trp Leu Ala Ala Ser His Asp Ala Val Arg Ser  
 65 70 75 80

Leu Leu Ala Asp Arg Arg Ile Ser Asn Asn Pro Ala Lys Thr Pro Pro  
 85 90 95

Phe Ser Gln Arg Glu Ala Leu Gln Lys Glu Arg Gly Gln Phe Ser Arg  
 100 105 110

His Leu Phe Asn Met Asp Ser Pro Glu His Asp Val Ala Arg Arg Met  
 115 120 125

Ile Ala Glu Asp Phe Thr Pro Arg His Ala Glu Ala Val Arg Pro Tyr  
 130 135 140

Phe Glu Glu Val Phe Gly Glu Ile Val Asp Glu Val Val His Lys Gly  
 145 150 155 160

Pro Pro Ala Glu Met Ile Glu Ser Phe Ala Phe Pro Val Ala Thr Arg  
 165 170 175

Thr Ile Cys Lys Val Leu Asp Ile Pro Glu Asp Asp Cys Glu Tyr Phe  
 180 185 190

Gln Lys Arg Thr Glu Gln Ile Ile Glu Met Asp Arg Gly Glu Glu Asn  
 195 200 205

Leu Glu Ala Val Val Glu Leu Arg Arg Tyr Val Asp Ser Val Met Gln  
 210 215 220

Gln Arg Thr Ar G Lys Pro Gly Asp Asp Leu Leu Ser Arg Met Ile Val  
 225 230 235 240

Lys Ala Lys Ala Ser Lys Glu Ile Glu Leu Ser Asp Ala Asp Leu Val  
 245 250 255

Asp Asn Ala Met Phe Leu Leu Val Ala Gly His Glu Pro Ser Ala Asn  
 260 265 270

Met Leu Gly Leu Gly Val Leu Ala Leu Ala Glu Phe Pro Asp Val Ala  
 275 280 285

Glu Glu Leu Arg Ala Glu Pro His Leu Trp Pro Gly Ala Ile Asp Glu  
 290 295 300

Met Leu Arg Tyr Tyr Thr Ile Ala Arg Ala Thr Lys Arg Val Ala Ala  
 305 310 315 320

Ala Asp Ile Glu Tyr Glu Gly His Thr Ile Lys Glu Gly Asp Ala Val  
 325 330 335

Ile Val Leu Leu Asp Thr Ser Asn Arg Asp Pro Lys Val His Ala Glu  
 340 345 350

Pro Asn Arg Leu Asp Ile His Arg Ser Ala Gly Asn His Leu Ala Phe  
 355 360 365

Ser His Gly Pro His Gln Cys Leu Gly Lys His Leu Val Arg Val Gln  
 370 375 380

Leu Glu Ile Ala Leu Arg Ala Val Ala Glu Arg Leu Pro Gly Leu Arg  
 385 390 395 400

Leu Asp Ile Ala Lys Glu Asp Ile Pro Phe Arg Gly Asp Ala Leu Ser  
 405 410 415

Tyr Gly Pro Arg Gln Leu Arg Val Thr Trp  
 420 425

<210> 16

<211> 454

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 16

Met Glu Lys Thr Asp Val Asp Arg Leu Arg Thr Leu Asp Arg Glu His  
 1 5 10 15

Met Trp Tyr Pro Trp Thr Pro Met Thr Glu Trp Met Ala Arg Asp Gln  
 20 25 30

Leu Val Val Glu Arg Ala Glu Gly Cys Trp Leu Ile Asp Ala Asp Gly  
 35 40 45

Lys Arg Tyr Leu Asp Gly Arg Ser Ser Met Gly Met Asn Leu His Gly  
 50 55 60

His Gly Arg Ser Glu Ile Val Glu Ala Leu Val Ala Gln Ala Arg Lys  
 65 70 75 80

Ala Gly Glu Thr Thr Leu Tyr Arg Val Ser His Pro Ala Ala Val Glu  
 85 90 95

Leu Ala Ala Arg Leu Ala Ser Met Ala Pro Ala Gly Leu Gln Arg Val  
 100 105 110  
 Phe Phe Ala Glu Ser Gly Ser Thr Ala Val Glu Thr Ala Leu Lys Ala  
 115 120 125  
 Ala Tyr Ala Tyr Trp Val Ala Lys Gly Glu Pro Gln Arg Ser Thr Phe  
 130 135 140  
 Val Ser Met Glu Gly Gly Tyr His Gly Glu Thr Leu Gly Thr Val Ser  
 145 150 155 160  
 Leu Arg Gly Thr Asn Gly Glu Gln Val Asp Met Ile Arg Lys Thr Tyr  
 165 170 175  
 Glu Pro Leu Leu Phe Pro Ser Leu Ser Phe His Gln Pro His Cys Tyr  
 180 185 190  
 Arg Cys Pro Val Gly Gln Ser Ser Asp Ser Asp Cys Gly Leu Glu Cys  
 195 200 205  
 Thr Asp Ser Leu Glu Asn Leu Leu Thr Arg Glu Lys Gly Arg Ile Ala  
 210 215 220  
 Ala Val Ile Val Glu Pro Arg Val Gln Ala Leu Ala Gly Val Ile Thr  
 225 230 235 240  
 Ala Pro Glu Gly His Leu Ala Lys Val Ala Glu Ile Thr Arg Arg His  
 245 250 255  
 Gly Val Leu Leu Ile Val Asp Glu Val Leu Thr Gly Trp Ala Arg Thr  
 260 265 270  
 Gly Pro Thr Phe Ser Cys Glu Ala Glu Gly Val Thr Pro Asp Leu Met  
 275 280 285  
 Thr Val Gly Lys Ala Leu Thr Gly Gly Tyr Leu Pro Leu Ser Ala Thr  
 290 295 300  
 Leu Ala Thr Glu Glu Ile Phe Gly Ala Phe Arg Glu Ser Val Phe Leu  
 305 310 315 320  
 Ser Gly Ser Thr Tyr Ser Gly Tyr Ala Leu Gly Ala Ala Val Ala Leu  
 325 330 335  
 Ala Ser Leu Asp Leu Phe Glu Lys Glu Asp Val Pro Ala Arg Ala Lys  
 340 345 350  
 Ala Leu Ala Asp Val Leu Thr Thr Ala Leu Glu Pro Phe Arg Ala Leu  
 355 360 365  
 Thr His Val Gly Asp Val Arg Gln Leu Gly Leu Ile Ala Gly Val Glu  
 370 375 380  
 Leu Val Ala Asp Arg Glu Thr Arg Ala Pro Tyr Pro Pro Gln Glu Arg  
 385 390 395 400  
 Val Val Asp Arg Ile Cys Thr Leu Ala Arg Asp Asn Gly Val Leu Val  
 405 410 415  
 Asn Ala Val Pro Gly Asp Val Ile Thr Met Leu Pro Ser Pro Ser Met  
 420 425 430  
 Ser Pro Asp Asp Leu Arg Phe Leu Thr Gly Thr Leu Tyr Thr Ala Val

435

440

445

Arg Glu Val Thr Glu Glu  
450

&lt;210&gt; 17

&lt;211&gt; 326

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 17

Met Arg Ala Ala Val Ile Arg Ala Trp Gly Gly Pro Glu Arg Leu Thr  
1 5 10 15

Leu Asp Arg Val Glu Arg Pro Ser Pro Pro Pro Gly Trp Ile Ala Val  
20 25 30

Arg Val Glu Ala Cys Ala Leu Asn His Leu Asp Ile His Val Arg Asn  
35 40 45

Gly Leu Pro Gly Val Arg Leu Glu Leu Pro His Val Ser Gly Gly Asp  
50 55 60

Val Val Gly Val Val Glu Gln Ala Thr Asp Glu Ala Gly Glu Arg Leu  
65 70 75 80

Leu Gly Ser Arg Val Leu Leu Asp Pro Met Ile Gly Arg Gly Ile Leu  
85 90 95

Gly Glu His Tyr Trp Gly Gly Leu Ala Glu Tyr Val Val Ala Pro Ala  
100 105 110

His Asn Ala Leu Pro Val Pro Asp Gln Asp Ala Asp Pro Ala Arg Tyr  
115 120 125

Ala Ala Leu Pro Ile Ser Tyr Gly Thr Ala Gln Arg Met Leu Phe Ser  
130 135 140

Arg Ala Arg Leu Arg Pro Gly Glu Ser Val Leu Leu Phe Gly Ala Thr  
145 150 155 160

Gly Gly Val Gly Val Ala Cys Ala Gln Leu Ala Leu Arg Ala Gly Ala  
165 170 175

Arg Ile Ile Ala Cys Ser Gly Ser Pro Ala Lys Leu Ala Arg Leu Arg  
180 185 190

Arg Leu Gly Val Ile Asp Thr Ile Asp Thr Gly Thr Glu Asp Val Arg  
195 200 205

Arg Arg Val Arg Glu Leu Thr Asp Gly Gly Ala Asp Leu Val Val Asp  
210 215 220

Tyr Gln Gly Lys Asp Thr Trp Pro Val Ser Leu Arg Ser Ala Arg Ala  
225 230 235 240

Gly Gly Arg Ile Val Thr Cys Gly Ala Thr Thr Gly Tyr Glu Ala Thr  
245 250 255

Thr Asp Leu Arg Tyr Val Trp Ser Arg Gln Leu Asp Ile Leu Gly Ser  
260 265 270

Asn Ala Trp His Arg Asp Asp Leu His Thr Leu Val Asp Leu Val Ala  
275 280 285

Thr Asp Ala Leu Glu Pro Val Val His Ala Asp Phe Pro Leu Ser Arg  
 290 295 300  
 Ala Pro Glu Ala Val Ala Glu Leu Glu Glu Arg Arg Ala Phe Gly Lys  
 305 310 315 320

Val Val Ile Arg Thr Ala  
 325

<210> 18  
 <211> 556  
 <212> PRT  
 <213> Streptomyces parvulus Tü4055

<400> 18  
 Met Thr Gly Asn Thr Thr Ser Ala Ala Phe Leu Arg Arg Thr Gln Asn  
 1 5 10 15  
 Ala Leu Ala Met Gln Arg Lys Ile Cys Ala Gln Pro Glu Glu Thr Ala  
 20 25 30  
 Glu Arg Val Phe Ser Asp Ile Leu Ser Val Ser Arg Asp Thr Gly Phe  
 35 40 45  
 Gly Arg Glu His Gly Leu Ala Gly Val Arg Thr Arg Gln Glu Trp Arg  
 50 55 60  
 Arg Ala Val Pro Ile Arg Thr Tyr Asp Glu Leu Ala Pro Tyr Val Glu  
 65 70 75 80  
 Arg Gln Phe Ser Gly Glu Arg Arg Val Leu Thr Thr Asp Asp Pro Arg  
 85 90 95  
 Ala Phe Leu Arg Thr Ser Gly Ser Thr Gly Arg Ala Lys Leu Val Pro  
 100 105 110  
 Thr Thr Asp His Trp Arg Arg Val Tyr Arg Gly Pro Ala Leu Tyr Ala  
 115 120 125  
 Gln Trp Gly Leu Tyr Phe Glu Gln Ile Gly Thr His Arg Leu Thr Gly  
 130 135 140  
 Asp Glu Val Leu Asp Leu Ser Trp Glu Pro Gly Pro Ile Arg His Arg  
 145 150 155 160  
 Leu Arg Gly Phe Pro Val Tyr Ser Ile Thr Glu Arg Pro Val Ser Asp  
 165 170 175  
 Asp Pro Asp Asp Trp Asn Pro Pro Trp Arg His Ala Arg Trp Phe Thr  
 180 185 190  
 Arg Asp Ala Gly Ala Ala Thr Met Ala Asp Leu Leu Tyr Gly Lys Leu  
 195 200 205  
 Leu Arg Leu Ala Ala His Asp Leu Arg Leu Ile Val Ser Val Asn Pro  
 210 215 220  
 Ser Lys Ile Val Leu Leu Ala Glu Thr Leu Lys Glu Asn Ala Glu Arg  
 225 230 235 240  
 Leu Ile Gln Asp Leu His Asp Gly His Gly Thr Asp Arg Ala Ala Arg  
 245 250 255

Pro Asp Phe Leu Arg Arg Leu Thr Ala Ala Phe Asp Arg Thr Gly Gly  
 260 265 270

Arg Pro Leu Leu Thr Asp Leu Trp Pro Gly Leu Arg Leu Leu Val Cys  
 275 280 285

Trp Asn Ser Ala Ser Ala Ala Leu Tyr Gly Pro Trp Leu Ser Arg Leu  
 290 295 300

Ala Thr Gly Val Ala Ala Leu Pro Phe Ser Thr Thr Gly Thr Glu Gly  
 305 310 315 320

Ile Val Thr Leu Pro Val Asp Asp His Leu Ser Ala Gly Pro Leu Ala  
 325 330 335

Val Asp Gln Gly His Phe Glu Phe Val Pro Trp Gln Asp Leu Asp Asp  
 340 345 350

Gly Ser Pro Leu Pro Glu Asp Thr Pro Thr Leu Gly Tyr Asp Glu Leu  
 355 360 365

Glu Leu Gly Ala Asp Tyr Arg Leu Val Met Ser Gln Ala Asn Gly Leu  
 370 375 380

Tyr Arg Tyr Asp Val Gly Asp Val Tyr Arg Val Val Gly Ala Val Gly  
 385 390 395 400

Ala Thr Pro Arg Leu Glu Phe Leu Gly Arg Ala Gly Phe Gln Ser Ser  
 405 410 415

Phe Thr Gly Glu Lys Leu Thr Glu Ser Asp Val His Thr Ala Val Met  
 420 425 430

Arg Val Leu Gly Ser Glu Arg Thr Asp His Pro His Phe Ser Gly Ile  
 435 440 445

Pro Val Trp Asp Thr Pro Pro His Tyr Leu Val Ala Ile Glu Trp Ala  
 450 455 460

Asp Ala His Gly Thr Leu Asn Val Gln Asp Thr Ala Arg Arg Ile Asp  
 465 470 475 480

Ala Thr Leu Gln Glu Val Asn Val Glu Tyr Ala Asp Lys Arg Arg Ser  
 485 490 495

Gly Arg Leu Arg Pro Leu Gln Ile Leu Pro Leu Val Pro Gly Ala Phe  
 500 505 510

Gly Gln Ile Ala Glu Arg Arg Phe Arg Gln Gly Thr Ala Gly Ala Gln  
 515 520 525

Ile Lys His His Trp Leu Gln Lys Asp Ser Ala Phe Leu Asp Thr Leu  
 530 535 540

Arg Asp Leu Asp Leu Val Arg Ala Arg Pro Gly Thr  
 545 550 555

<210> 19

<211> 305

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 19

Met Arg Ile Gly Phe Ala Ala Pro Met Ser Gly Pro Trp Ala Thr Pro



1                      5                      10                      15  
 Asp Thr Ala Val His Val Ala Arg Thr Ala Glu Gln Leu Gly Tyr Ala  
                     20                      25                      30  
 Ser Leu Trp Thr Tyr Gln Arg Val Leu Gly Ala Pro Asp Asp Ser Trp  
                     35                      40                      45  
 Gly Glu Ala Asn Arg Ser Val His Asp Pro Leu Thr Thr Leu Ala Phe  
                     50                      55                      60  
 Leu Ala Ala His Thr Thr Gly Ile Arg Leu Gly Val Ala Val Leu Ile  
                     65                      70                      75                      80  
 Met Pro Leu His Thr Pro Ala Val Leu Ala Lys Gln Leu Thr Thr Leu  
                     85                      90                      95  
 Asp Leu Leu Ser Gly Gly Arg Leu Asp Val Gly Leu Gly Asn Gly Trp  
                     100                      105                      110  
 Ala Ala Glu Glu Tyr Ala Ala Ala Gly Val Thr Pro Thr Gly Leu Ser  
                     115                      120                      125  
 Arg Arg Ala Glu Asp Phe Leu Ala Cys Leu Arg Ala Leu Trp Gly Glu  
                     130                      135                      140  
 Gln Thr Val Val Glu His Asp Gly Pro Phe Tyr Arg Val Pro Pro Ala  
                     145                      150                      155                      160  
 Arg Phe Asp Pro Lys Pro Ala Gln Ser Pro His Pro Pro Leu Leu Leu  
                     165                      170                      175  
 Gly Gly Ala Ala Pro Gly Ala Leu Arg Arg Ala Gly Arg Leu Cys Asp  
                     180                      185                      190  
 Gly Trp Ile Ala Ser Ser Lys Ala Gly Pro Ala Ala Ile Arg Asp Ala  
                     195                      200                      205  
 Ile Thr Val Val Arg Asp Ser Ala Glu Arg Thr Gly Arg Asp Pro Ala  
                     210                      215                      220  
 Thr Leu Arg Phe Val Cys Arg Ala Pro Val Arg Leu Arg Thr Arg Ser  
                     225                      230                      235                      240  
 Ala Pro Asn Glu Pro Pro Leu Thr Gly Thr Ala Glu Thr Ile Arg Ala  
                     245                      250                      255  
 Asp Leu Ala Ala Leu Ala Asp Thr Gly Leu Thr Glu Ile Phe Leu Asp  
                     260                      265                      270  
 Pro Asn Phe Asp Pro Glu Ile Gly Ser Pro Asp Ala Pro Thr Gly Asp  
                     275                      280                      285  
 Val Arg His Arg Val Asp Leu Leu Leu His Glu Leu Ala Pro Ala Asn  
                     290                      295                      300

Trp  
305

<210> 20  
 <211> 248  
 <212> PRT  
 <213> Streptomyces parvulus Tü4055

&lt;400&gt; 20

Met Leu Ile Ala Arg Ala Ala Val Gly Glu Asp Arg Thr Tyr Ala Arg  
 1 5 10 15

Val Asp Thr Asp Thr Gly Leu Ile His Leu Leu Ala Gly Thr Pro Tyr  
 20 25 30

Asp Glu Ile Arg Pro Thr Gly Glu Thr Arg Pro Leu Ala Glu Ala Arg  
 35 40 45

Leu Leu Ala Pro Val Glu Pro Ser Lys Val Leu Val Ala Gly Arg Asn  
 50 55 60

Tyr Gly Asp Val Val Thr Pro Asp Leu Val Val Phe Met Lys Pro Ser  
 65 70 75 80

Thr Ser Val Val Gly Pro Arg Ser Thr Val Leu Leu Pro Ala Glu Ala  
 85 90 95

Lys Gln Val Arg Tyr Glu Gly Glu Leu Ala Val Val Ile Gly Arg Arg  
 100 105 110

Cys Lys Asp Val Pro Glu Asp Thr Ala Asp Gln Ala Val Phe Gly Tyr  
 115 120 125

Thr Cys Ala Asn Asp Val Thr Ala Trp Asp Val Gly Glu Pro Lys Gly  
 130 135 140

His Trp Thr Lys Ala Lys Ser Phe Asp Thr Phe Cys Pro Leu Gly Pro  
 145 150 155 160

Trp Ile Arg Thr Asp Leu Asp Pro Ala Asp Leu Val Leu Arg Thr Thr  
 165 170 175

Val Asn Gly Thr Leu Arg Gln Asp Gly Ser Thr Lys Glu Met Asn Arg  
 180 185 190

Asn Val Arg Ala Leu Val Ser Arg Cys Ser Ser Leu Met Thr Leu Leu  
 195 200 205

Pro Gly Asp Val Ile Leu Thr Gly Thr Pro Ala Gly Ala Gly Val Leu  
 210 215 220

Arg Pro Gly Asp Glu Val Val Val Glu Ile Asp Gly Ile Gly Ser Leu  
 225 230 235 240

Ala Asn Pro Ile Gly Val Ala Lys  
 245

&lt;210&gt; 21

&lt;211&gt; 675

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus T4055

&lt;400&gt; 21

Met Ser Val Ile Arg Pro Thr Ala Glu Thr Glu Arg Ala Val Val Val  
 1 5 10 15

Val Pro Ala Gly Thr Thr Cys Ala Asp Ala Val Thr Ala Ala Lys Leu  
 20 25 30

Pro Arg Asn Gly Pro Asn Ala Ile Val Val Val Arg Asp Pro Ser Gly  
 35 40 45

Ala Leu Arg Asp Leu Asp Trp Thr Pro Asp Ser Asp Val Glu Val Glu  
 50 55 60  
 Ala Val Ala Leu Ser Ser Glu Asp Gly Leu Thr Val Leu Arg His Ser  
 65 70 75 80  
 Thr Ala His Val Leu Ala Gln Ala Val Gln Gln Leu Trp Pro Glu Ala  
 85 90 95  
 Arg Leu Gly Ile Gly Pro Pro Ile Glu Asn Gly Phe Tyr Tyr Asp Phe  
 100 105 110  
 Asp Val Glu Arg Pro Phe Gln Pro Glu Asp Leu Glu Arg Val Glu Gln  
 115 120 125  
 Arg Met Lys Glu Ile Ile Lys Ser Gly Gln Arg Phe Cys Arg Arg Glu  
 130 135 140  
 Phe Pro Asp Arg Glu Ala Ala Arg Ala Glu Leu Ala Lys Glu Pro Tyr  
 145 150 155 160  
 Lys Leu Glu Leu Val Asp Leu Lys Gly Asp Val Asp Ala Ala Glu Ala  
 165 170 175  
 Met Glu Val Gly Gly Ser Asp Leu Thr Ile Tyr Asp Asn Leu Asp Ala  
 180 185 190  
 Arg Thr Gly Asp Val Cys Trp Ser Asp Leu Cys Arg Gly Pro His Leu  
 195 200 205  
 Pro Ser Thr Arg Leu Ile Pro Ala Phe Lys Leu Leu Arg Asn Ala Ala  
 210 215 220  
 Ala Tyr Trp Arg Gly Ser Glu Lys Asn Pro Gln Leu Gln Arg Ile Tyr  
 225 230 235 240  
 Gly Thr Ala Trp Pro Thr Arg Asp Glu Leu Lys Ser His Leu Ala Ala  
 245 250 255  
 Leu Glu Glu Ala Ala Lys Arg Asp His Arg Arg Ile Gly Glu Glu Leu  
 260 265 270  
 Asp Leu Phe Ala Phe Asn Lys Glu Ile Gly Arg Gly Leu Pro Leu Trp  
 275 280 285  
 Leu Pro Asn Gly Ala Ile Ile Arg Asp Glu Leu Glu Asp Trp Ala Arg  
 290 295 300  
 Lys Thr Glu Arg Lys Leu Gly Tyr Lys Arg Val Val Thr Pro His Ile  
 305 310 315 320  
 Thr Gln Glu Asp Leu Tyr Tyr Leu Ser Gly His Leu Pro Tyr Tyr Ala  
 325 330 335  
 Glu Asp Leu Tyr Ala Pro Ile Asp Ile Asp Gly Glu Lys Tyr Tyr Leu  
 340 345 350  
 Lys Pro Met Asn Cys Pro His His His Met Val Tyr Lys Ala Arg Pro  
 355 360 365  
 His Ser Tyr Arg Asp Leu Pro Tyr Lys Val Ala Glu Tyr Gly Thr Val  
 370 375 380  
 Tyr Arg Phe Glu Arg Ser Gly Gln Leu His Gly Met Met Arg Thr Arg

92

Pro His Ser Ala Ala Pro Arg His Arg Gly Leu Leu Asn Ala Trp Trp  
                   20                                  25                                  30

Gly Ala Trp Val Trp Ala Thr Val Phe Asp Arg Tyr Ala Ser Arg Thr  
                   35                                  40                                  45

Tyr Asp Asp Ala Gln Asp Val Asp Ala Ile His Asp Ala Ala Gly Leu  
                   50                                  55                                  60

Val Met Ala Gly Ala Gly Phe Asp Ile Leu Ala Ala Val Leu Ala Ile  
                   65                                  70                                  75                                  80

Leu Phe Val Arg Arg Leu Thr Ala Ala Gln His Ala Lys Ala Leu Ala  
                                   85                                  90                                  95

Gly Pro Thr Pro Pro Thr His  
                   100

<210> 23

<211> 868

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 23

Met Glu Ala Phe Leu Leu Leu Ala Ala Glu Ser Val Leu Leu Arg Arg  
                   1                                  5                                  10                                  15

Asp Gln Ser Val Tyr Val Thr Pro Gly Ser Glu Pro Asp Gly Pro Pro  
                                   20                                  25                                  30

Arg Ala Ala Leu Arg Arg Leu Glu Ala Glu Leu Leu Gly Arg Gly His  
                   35                                  40                                  45

Ala Val Ser Ala Pro Leu His Ala Val Leu Ala Ser Leu Asp Ser Glu  
                   50                                  55                                  60

Glu Leu Ala Ala Ala His Val Arg Leu Val Gly Leu Val Asp Asp Leu  
                   65                                  70                                  75                                  80

Leu Gly Ser Asp Arg Thr His Thr Pro Leu Phe Arg Arg Phe Pro Arg  
                                   85                                  90                                  95

Thr Val Pro Arg Asp Thr Glu Ala Leu Tyr Val Asp Arg Val Phe Ala  
                   100                                  105                                  110

Phe Leu Leu Gln Gln Pro Glu Gln Pro Cys Val Leu Cys Gly Glu Ala  
                   115                                  120                                  125

Arg Thr Val Leu Pro Val Ser Pro Cys Ala His Leu Val Cys Arg Leu  
                   130                                  135                                  140

Cys Trp Asp Gly Ser Asp Tyr Ala Gly Cys Pro Leu Cys His Arg Arg  
                   145                                  150                                  155                                  160

Ile Asp Gly Asp Asp Pro Phe Leu Arg Pro Val Arg Ala Val Gly Ala  
                                   165                                  170                                  175

Ala Arg Ala Thr Val Pro Gly Pro Leu Arg Leu Leu Arg Leu Gly Thr  
                   180                                  185                                  190

Asp Met Thr Ala Asp Ala Thr Thr Ala Val Asp Ala Leu Leu Ala Arg  
                   195                                  200                                  205

Arg Thr Pro Leu Ser Pro Gln Asp Arg Asp Asp Leu Leu Thr Leu Leu  
 210 215 220  
 Pro Leu Thr Pro Ala Gly Arg Gly Asp Leu Pro Gln Asp Ile Pro Val  
 225 230 235 240  
 Arg Glu Thr Lys Ala Leu Val Leu Gly Ala Leu Val Arg Arg Ala Pro  
 245 250 255  
 Ser Arg Pro Ala Leu Arg Arg Leu Leu Ala Glu Arg Leu Thr Thr Ala  
 260 265 270  
 Thr Asp Val Leu Arg Leu Leu Ala Val Leu Ser Gly Gly Asp Ala Gly  
 275 280 285  
 Leu Val Thr Pro Ala Arg Phe Thr Asn Val Pro Arg Ser Leu Arg Arg  
 290 295 300  
 Asp Leu Leu Ala Val Leu Asp Gly Leu Pro Ala Pro Tyr Leu Val Glu  
 305 310 315 320  
 Asp Met Leu Arg His Pro Thr Ala Trp Lys Arg Ala Ala Glu Val Leu  
 325 330 335  
 His Pro Phe Glu Gly His Thr Arg His Pro Arg Ala Ala Leu Ala Thr  
 340 345 350  
 Ala Val Leu Arg Ala Thr Pro Leu Asp Pro Asp Thr Ala Phe Gly Ala  
 355 360 365  
 Ala Leu Leu Thr Thr Ala Ala Ala His Pro Asp Ala Val Arg Pro Asp  
 370 375 380  
 Gly Thr Arg Val Arg Pro Ala Thr Trp Ala Gly Arg Leu Glu Gln Ala  
 385 390 395 400  
 Met Ala Glu Gly Asp Ala Ala Arg Ala Ala Ala Leu Ala Gly Glu Arg  
 405 410 415  
 Pro Gly Glu Leu Val Arg Arg Leu Asp Val Leu Leu Arg Leu His Thr  
 420 425 430  
 Asp Glu Ala Leu Val Pro Glu Leu Glu Lys Ala Leu Arg His Gly Leu  
 435 440 445  
 Pro Lys Val Gly Pro Gly Pro Leu Leu Ser Ala Leu Gly Ala Leu Arg  
 450 455 460  
 Thr Arg Thr Glu Asp Arg Thr Gly Thr Arg Arg Val Phe Phe Pro Arg  
 465 470 475 480  
 Gly Asp Val Thr Arg Ala Leu Ser Val Pro Glu Arg Arg Pro Ala Leu  
 485 490 495  
 Pro Ala Gly Pro Val Ser Glu Val Val Ala Leu Leu Glu Gly Glu Leu  
 500 505 510  
 Leu Arg Arg Phe Ala Ala Gly Arg Pro Tyr Glu Leu Ser Val Leu Asp  
 515 520 525  
 Ala Gly Leu Thr Asp Leu Thr Val Pro Phe Thr Glu Arg Thr Ala Ala  
 530 535 540  
 Lys Ala Leu Val Thr Val Gly Arg Gly Ser Val Gln Ala Leu Pro Glu

545		550		555		560
Gly Ser Val Leu Arg Leu Phe Leu His Trp Thr Glu Pro Arg Gly Asn						
	565			570		575
Arg Thr Asp Leu Asp Leu Ser Val Ala Phe Phe Asp Ala Glu Trp Thr						
	580		585			590
Phe Thr Gly Leu Cys Asp Tyr Thr Asn Leu Val His Gly Pro Asp Ala						
	595		600			605
Ala Ile His Ser Gly Asp Leu Thr Ser Ala Pro Ala Pro Arg Gly Ala						
	610		615			620
Thr Glu Tyr Val Asp Leu Asp Leu Glu Arg Leu Ala Arg Arg Gly Asp						
625		630		635		640
Thr Tyr Ala Val Pro Leu Val Phe Ser Tyr Asn Asn Val Pro Phe Glu						
	645		650			655
Glu Leu Pro Asp Ala Phe Ala Gly Phe Met Ala Leu Pro Ala Glu Gly						
	660		665			670
Pro Arg Asp Ala Thr Tyr Asp Pro Arg Thr Val Arg Gln Arg Phe Asp						
	675		680			685
Leu Ala Gly Asp Ser Lys Val Cys Leu Pro Met Ile Val Asp Leu Ala						
	690		695			700
Arg Arg Arg Ala Leu Trp Thr Asp Thr His Leu Pro Ser Ala Gly Gly						
705		710		715		720
Phe Gln Ser Ile Gly Ser His Gly Gly Gly Glu Leu Ala Ala Val Ala						
	725		730			735
Gly Asp Leu Trp Gln Gln Phe Thr Ser Gly Gly Arg Ala Thr Leu Trp						
	740		745			750
Asp Leu Ala Val Leu Arg Ala Ala Ala Leu Ser Pro Glu Val Ala Val						
	755		760			765
Val Ser Arg Glu Pro Glu Pro Ala Val Leu Arg Tyr Arg Arg Arg Ala						
	770		775			780
Ala Glu Ser Glu Ala Ala Phe Ala Val Arg Val Ala Ser His Lys Asp						
785		790		795		800
Ala Glu Glu Arg Leu Ala His Thr Asp Pro Asp Ser Ala Ala Ala Gly						
	805		810			815
Leu Ala Ala Gly Arg Arg Val Phe Leu Ala Thr Val His Gly Asp Val						
	820		825			830
Arg Pro Pro Gly Ala Ser Gly Thr Ser Tyr Arg Leu Phe Pro Gly Ala						
	835		840			845
Gly Asp Ala Ser Pro Thr Leu Thr Arg Val Thr Ala Gly Asp Leu Leu						
	850		855			860
Ala Glu Leu Gly						
865						

&lt;210&gt; 24

&lt;211&gt; 212

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 24

Met Ala Glu Gln Ile Ala Gly Ile Glu Ile Pro Asp Ser Ala Pro Ala  
 1 5 10 15

Arg Glu Ala Thr Asp Leu Ile Arg Asp Thr Thr Pro Pro Leu Ile Phe  
 20 25 30

His His Ser Arg Arg Val Tyr Leu Phe Gly Ser Leu Gln Ala Ala Ala  
 35 40 45

Leu Gly Ile Arg Pro Asp Pro Glu Leu Leu Tyr Ile Ala Ala Leu Phe  
 50 55 60

His Asp Thr Gly Leu Val Pro Pro Tyr Arg Gly Asp Asp Gln Arg Phe  
 65 70 75 80

Glu Met Asp Gly Ala Asp Gln Ala His Ala Phe Leu Leu Ala His Gly  
 85 90 95

Ile Pro Glu Ala Asp Ala Asp Thr Val Trp Thr Ala Val Ala Leu His  
 100 105 110

Thr Thr Pro Glu Val Pro Tyr Arg Met Ala Pro Glu Ile Ala Ala Thr  
 115 120 125

Thr Ala Gly Val Glu Thr Asp Val Leu Gly Leu Arg Leu Gly Asn Leu  
 130 135 140

Thr Arg Ala Gln Ile Asp Ala Val Thr Ala Ala His Pro Arg Pro Asp  
 145 150 155 160

Phe Lys Lys Gln Ile Leu Arg Ala Phe Thr Glu Gly Phe Glu His Arg  
 165 170 175

Pro Ala Thr Thr Phe Gly Thr Val Asn Ala Asp Val Leu Glu His Phe  
 180 185 190

Ala Pro Gly Phe Arg Arg Thr Asp Phe Val Glu Val Ile Glu Asn Ser  
 195 200 205

Ala Trp Pro Glu  
 210

&lt;210&gt; 25

&lt;211&gt; 329

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 25

Met Thr Ala Arg Ala His Ser Val Gly Ile Leu Val Phe Asp Gly Met  
 1 5 10 15

Lys Met Leu Asp Leu Ser Gly Pro Ala Glu Val Phe Ala Glu Ala Asn  
 20 25 30

Arg Phe Gly Ala Arg Tyr Arg Leu Gly Val Val Ser Pro Asp Gly Ala  
 35 40 45

Pro Val Arg Ser Ser Ile Gly Leu Leu Val Pro Ala Glu Ala Asp Ala  
 50 55 60



Arg Ser Ala Gly Pro Pro Asp Thr Leu Val Val Val Gly Gly Asp Ala  
 65 70 75 80  
 Leu Pro Gly Ser Pro Val Asp Pro Arg Leu Ile Asp Ala Ala Lys Ala  
 85 90 95  
 Leu Ala Ala Arg Ala Gly Arg Val Ala Ser Val Cys Thr Gly Ala Phe  
 100 105 110  
 Val Leu Gly Ala Ala Gly Leu Leu Glu Gly Arg Arg Ala Thr Thr His  
 115 120 125  
 Trp Gln His Thr Thr Ala Leu Ala Arg Arg Cys Pro Ser Thr Arg Val  
 130 135 140  
 Glu Pro Asp Ala Ile Phe Val Lys Asp Gly Ala Thr Tyr Thr Ser Ala  
 145 150 155 160  
 Gly Val Thr Ala Gly Ile Asp Leu Ala Leu Ala Leu Leu Glu Glu Asp  
 165 170 175  
 His Gly Pro Asp Leu Ala Arg Arg Val Ala Arg Ser Leu Val Val Tyr  
 180 185 190  
 Leu Gln Arg Ala Gly Gly Gln Ser Gln Phe Ser Ala Ser Leu Arg Gly  
 195 200 205  
 Pro Ala Pro Arg Thr Pro Val Leu Arg Gln Val Gln Asp Ala Val Gln  
 210 215 220  
 Ala Asp Pro Ala Ala Asp His Ser Leu Ala Ala Leu Ala Ala Arg Val  
 225 230 235 240  
 Arg Val Ser Pro Arg His Leu Thr Arg Met Phe Arg Ala Glu Leu Asp  
 245 250 255  
 Val Thr Pro Val Lys Tyr Val Glu Leu Ile Arg Phe Asp Ile Ala Lys  
 260 265 270  
 Ala Leu Leu Asp Ser Gly His Asn Ala Thr Glu Ala Ala Ala Leu Ser  
 275 280 285  
 Gly Phe Pro Ser Tyr Glu Ser Leu Arg Arg Ala Phe Ala Arg His Leu  
 290 295 300  
 Gly Leu Ser Pro Thr Arg Tyr Arg Gln Arg Phe Ala Thr Thr Val Pro  
 305 310 315 320  
 Asp Ala Gly Pro Arg Pro Asp Gly Gly  
 325

&lt;210&gt; 26

&lt;211&gt; 276

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus T04055

&lt;400&gt; 26

Met Gly Thr Val Thr Thr Ser Asp Gly Thr Ser Ile Phe Tyr Lys Asp  
 1 5 10 15

Trp Gly Pro Arg Asp Ala Pro Pro Ile Val Phe His His Gly Trp Pro  
 20 25 30

Leu Thr Ala Asp Asp Trp Asp Asn Gln Met Leu Phe Phe Leu Ser His

35

40

45

Gly Tyr Arg Val Ile Ala His Asp Arg Arg Gly His Gly Arg Ser Gly  
 50 55 60  
 Gln Pro Ser Thr Gly His Glu Met Asp Thr Tyr Ala Ala Asp Val Ala  
 65 70 75 80  
 Ala Leu Thr Glu Ala Leu Asp Leu Arg Asp Ala Val His Ile Gly His  
 85 90 95  
 Ser Thr Gly Gly Gly Glu Val Ala Arg Tyr Val Ala Arg Ala Glu Pro  
 100 105 110  
 Gly Arg Val Ala Lys Ala Val Leu Val Gly Ala Val Pro Pro Val Met  
 115 120 125  
 Val Lys Ser Asp Ala Asn Pro Gly Gly Thr Pro Ile Glu Val Phe Asp  
 130 135 140  
 Gly Phe Arg Thr Ala Leu Ala Ala Asn Arg Ala Gln Phe Tyr Ile Asp  
 145 150 155 160  
 Val Pro Ser Gly Pro Phe Tyr Gly Phe Asn Arg Glu Gly Ala Lys Val  
 165 170 175  
 Ser Gln Gly Leu Ile Asp Asn Trp Trp Arg Gln Gly Met Ser Gly Ala  
 180 185 190  
 Ala Asn Ala His Tyr Glu Cys Ile Lys Ala Phe Ser Glu Thr Asp Phe  
 195 200 205  
 Thr Glu Asp Leu Lys Ala Ile Asp Val Pro Val Leu Val Ala His Gly  
 210 215 220  
 Thr Asp Asp Gln Val Val Pro Tyr Ala Asp Ser Ala Pro Leu Ser Val  
 225 230 235 240  
 Lys Leu Leu Lys Asn Gly Thr Leu Lys Ser Tyr Glu Gly Leu Pro His  
 245 250 255  
 Gly Met Leu Ser Thr His Pro Glu Val Val Asn Pro Asp Leu Leu Asp  
 260 265 270  
 Phe Val Arg Ser  
 275

&lt;210&gt; 27

&lt;211&gt; 185

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Td4055

&lt;400&gt; 27

Met Gly Val Met Ile Gly Pro Ala Gly Arg Glu Arg Asp Glu Gly Asp  
 1 5 10 15  
 His Val Thr Gln Gln Ala Pro Val Ala Thr Asp Glu Arg Arg Val Phe  
 20 25 30  
 Val Asp Lys Gln Thr Pro Gly Ala Tyr Lys Ala Phe Val Ala Ala Ala  
 35 40 45  
 Glu Ser Val Arg Glu Ala Ala Ala Ala Gly Leu Asp Arg Leu Leu  
 50 55 60

Val Glu Leu Val Asn Ile Arg Val Ser Gln Leu Asn Ala Cys Ala Tyr  
 65 70 75 80  
 Cys Leu Ser Leu His Thr Arg Ala Ala Leu Arg Ala Gly Glu Thr Thr  
 85 90 95  
 Gln Arg Leu Ala Val Leu Pro Ala Trp Arg Asp Thr Glu Leu Phe Thr  
 100 105 110  
 Ala Arg Glu Arg Ala Ala Leu Ala Leu Ala Glu Ala Thr Thr Arg Pro  
 115 120 125  
 Ala Asp Ala Ala Ala Gln Ser Ala Ala Tyr Ala Gln Ala Arg Gly Val  
 130 135 140  
 Leu Ser Asp Asp Glu Val Ser Ala Val Ile Trp Val Ala Ile Ser Ile  
 145 150 155 160  
 Asn Ala Phe Asn Arg Val Ser Val Leu Ser Lys His Pro Val Arg Gly  
 165 170 175  
 Ala Ala Pro Ala Pro Val Ser Pro Ala  
 180 185

<210> 28  
 <211> 324  
 <212> PRT  
 <213> Streptomyces parvulus Tü4055

<400> 28  
 Met Val Ser Asn Thr Glu Thr Arg Pro Ala Glu Met Arg Cys Gly Ala  
 1 5 10 15  
 Leu Glu Asp Glu Val Pro Ala Ala Gly Val Glu Val Leu Thr Ala Arg  
 20 25 30  
 Asp Val Pro Leu Gly Gly Pro Arg Ala Met Thr Val Arg Arg Thr Leu  
 35 40 45  
 Pro Gln Arg Ala Arg Thr Leu Ile Gly Ala Trp Cys Phe Ala Asp His  
 50 55 60  
 Tyr Gly Pro Asp Asp Val Ala Ala Ser Gly Gly Met Asp Val Ala Pro  
 65 70 75 80  
 His Pro His Ile Gly Leu Gln Thr Val Ser Trp Leu Phe Ser Gly Glu  
 85 90 95  
 Ile Glu His Arg Asp Ser Leu Gly Thr His Ala Phe Val Arg Pro Gly  
 100 105 110  
 Glu Leu Asn Leu Met Thr Gly Gly Phe Gly Ile Ala His Ser Glu Val  
 115 120 125  
 Ser Thr Pro Asp Thr Thr Val Leu His Gly Val Gln Leu Trp Val Ala  
 130 135 140  
 Leu Pro Glu Glu His Arg Asp Thr Gly Arg Asp Phe Gln His His Ala  
 145 150 155 160  
 Pro Ala Pro Val Ala Phe Asp Gly Gly Thr Ala Arg Val Phe Leu Gly  
 165 170 175

Ser Leu Ala Gly Asp Thr Ser Pro Val Ser Thr Phe Thr Pro Leu Leu  
180 185 190

Gly Ala Glu Leu Thr Leu Val Pro Gly Gly Thr Ala Thr Leu Asp Val  
195 200 205

Asp Pro Gly Phe Glu His Gly Val Leu Val Asp Ser Gly Asp Val Arg  
210 215 220

Val Glu Gly Ala Val Val Arg Pro Ala Glu Leu Gly Tyr Val Ala Pro  
225 230 235 240

Gly Arg Ala Thr Leu Thr Leu Thr Asn Glu Ser Ala Ala Pro Ala Arg  
245 250 255

Leu Ile Leu Leu Gly Gly Pro Pro Phe Pro Glu Glu Ile Ile Met Trp  
260 265 270

Trp Asn Phe Ile Gly Arg Ser His Asp Glu Ile Val Arg Ala Arg Glu  
275 280 285

Asp Trp Met Lys Gly Asp Arg Phe Gly Glu Val His Gly Tyr Asp Gly  
290 295 300

Ala Pro Leu Pro Ala Pro Glu Leu Pro Asn Ala Pro Leu Lys Pro Arg  
305 310 315 320

Arg Arg Ala Arg

<210> 29

<211> 126

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 29

Met Val Pro Thr Met Leu Cys Met Val Ala Val Pro Glu Ser His Ser  
1 5 10 15

Gly Trp Thr Phe Val Thr Asn His Ala Arg Val Leu Ala Ala Ile Ala  
20 25 30

Asp Asn Pro Asn Val Arg Ile Arg Asp Ile Ala Ala His Cys Arg Leu  
35 40 45

Thr Glu Arg Ala Val Gln Arg Ile Ile Ser Asp Leu Glu Gln Asp Gly  
50 55 60

Tyr Leu Ser His Thr Arg Asp Gly Arg Ser Asn Ile Tyr Arg Val Glu  
65 70 75 80

Pro Asp Lys Val Leu Arg His Pro Ala Glu Ala Gly Leu Thr Val Ala  
85 90 95

Ala Leu Leu Ser Leu Leu Val Arg Asp Glu Thr Asp His Gly Arg Ser  
100 105 110

Ala Gly Pro Gly Ser Arg Pro Ala Arg Ser Ser Ala Ala Arg  
115 120 125

<210> 30

<211> 127

<212> PRT

<213> Streptomyces parvulus Tü4055

&lt;400&gt; 30

Met Ser Leu Asp Glu Ala Val Ala Gly Cys Ser Arg His Thr Gly Arg  
 1 5 10 15

Arg Arg Leu Pro Ala Ala Glu Gln Pro Thr Gln Ala Gln Tyr Glu Ala  
 20 25 30

His Gly Ala Trp Val Val Ser Ala Arg Gly Ala Tyr Asp Met Asn Ser  
 35 40 45

Val Glu Pro Leu Ala Asp Ala Leu Lys Asp Ala Ala Glu Lys Ser Pro  
 50 55 60

Lys Val Val Leu Asp Ala Ser Gly Ile Thr Phe Ala Asp Ser Thr Leu  
 65 70 75 80

Leu Ser Leu Leu Ile Leu Thr His Gln Ala Thr Asp Phe Arg Val Ala  
 85 90 95

Ala Pro Thr Trp Gln Val Met Arg Leu Met Gln Leu Thr Gly Val Asp  
 100 105 110

Ala Phe Leu Lys Val Arg Ala Thr Val Glu Glu Ala Ala Thr Ala  
 115 120 125

&lt;210&gt; 31

&lt;211&gt; 82

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 31

Met Ser Met Ile Leu Pro Ala Glu Lys Glu Leu Arg Ala Val Leu Ala  
 1 5 10 15

Arg Phe Ala Gln Ala Arg Ile Asp His Asp Val Arg Pro Ser Gly Cys  
 20 25 30

Thr Ser Arg Leu Leu Glu Asp Ala Thr Tyr Thr Leu Cys Val Met Thr  
 35 40 45

Gly Ala Arg Thr Ala Glu Gln Ala Leu Arg Thr Ala Asp Glu Leu Leu  
 50 55 60

Ala Gln Phe Ala Glu Arg Thr Ala Ala Pro Val Glu Asp Glu Ala Leu  
 65 70 75 80

Ala Ala

&lt;210&gt; 32

&lt;211&gt; 70

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 32

Met Ser Asp Thr Arg Leu Arg Gln Arg Asp Glu Thr Ser Lys Gly Pro  
 1 5 10 15

Ala Thr Glu Ile Pro Ala Pro Gln Trp Arg Asp Leu Phe Leu Ala Pro  
 20 25 30

Asp Trp Gly Gly Thr Asp Glu Gln Val Ile Val Ala Glu Glu Ala Arg  
 35 40 45

Gly Pro Glu His Phe Thr Gly Ala Arg Arg Pro Arg Gly Gly Arg Arg  
 50 55 60

Ser Ser Arg Arg Ala Ala  
 65 70

<210> 33

<211> 172

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 33

Met Arg Cys Ser His Arg Ala Gly Gly Val Gly Ala Arg Ala Trp Leu  
 1 5 10 15

Gly Gly Asn Val Ala Val Asp Met Gly Glu Thr Gly Leu Asp Gly Ser  
 20 25 30

Ser Thr Gln Arg Ala Pro Glu Gly Ala Asp Pro Arg Ala Ala Ser Val  
 35 40 45

Thr Tyr Arg Arg Glu Ala Leu Arg Ile Ala Asp Ala Arg His Phe Ala  
 50 55 60

Thr Asp Tyr Leu Thr Arg Ser Gln Arg Asp Leu Arg Ser Pro Val Pro  
 65 70 75 80

Glu Arg Ala Ser Glu Ala Val His Leu Val Val Ser Glu Leu Ile Thr  
 85 90 95

Asn Ala Val Lys Tyr Gly Ala Asp Pro Ile Glu Leu Thr Leu Ser Leu  
 100 105 110

Thr Asp Asp Ala Val Thr Val Thr Val Arg Asp Gly Asp Thr Thr Leu  
 115 120 125

Pro Ala Pro Arg Pro Ala Asp Pro Ala Arg Val Gly Gln His Gly Leu  
 130 135 140

Glu Ile Val Ala Ala Leu Ser Gln Ala Val Glu Ile Arg Pro Glu Pro  
 145 150 155 160

Ser Gly Lys Arg Ile Thr Ala Arg Ile Ala Leu Thr  
 165 170

<210> 34a

<211> 105

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 34a

Met Gln Ser Ser Ser Ala Ser Val Arg Gly Glu Ile Val Ile Arg Arg  
 1 5 10 15

Ala Val Ala Arg Asp Ala Lys Arg Leu Ser Arg Leu Val Arg Gly Ser  
 20 25 30

Arg Ala Tyr Glu Gly Pro Tyr Ala Ala Met Val Ser Asp Tyr Arg Val  
 35 40 45

Gly Pro Asp Tyr Ile Glu Asn His Gln Val Phe Val Ala Ser Thr Pro  
 50 55 60

Arg Thr Pro Arg Thr Gly Cys Ser Ala Ser Thr Arg Cys Ser Ser Arg

65                                      70                                      75                                      80  
 Arg Arg Ser Trp Thr Cys Cys Ser Ser Arg Thr Val Pro Arg Ala Ala  
                                          85                                      90                                      95  
 Ala Ser Asp Gly Cys Leu Ser Ile Thr  
                                          100                                      105  
  
 <210> 35  
 <211> 638  
 <212> PRT  
 <213> Streptomyces parvulus T44055  
  
 <400> 35  
 Met Ala Gln Arg Arg Thr Pro Phe Gly Asp Arg Ala Arg Tyr Trp Phe  
   1                                      5                                      10                                      15  
 Asp Ser Thr Leu Ala Arg Gly Ala Ala Ala Leu Val Gly Trp Met Ala  
                                          20                                      25                                      30  
 Leu Leu Ser Leu Ala Val Val Val Pro Ala Ser Ala Val Met Val Trp  
                                          35                                      40                                      45  
 Thr Asp Pro Asp Ala Pro Pro Ser Leu Ala Glu Arg Leu Ala Glu Val  
                                          50                                      55                                      60  
 Trp Arg Leu Thr Gly Glu Thr Leu Arg Leu Gly Gly Ala Thr Gly Thr  
   65                                      70                                      75                                      80  
 Pro Leu Arg Ala Met Leu Ser Val Leu Leu Ala Leu Val Thr Leu Leu  
                                          85                                      90                                      95  
 Tyr Val Ser Thr Leu Val Gly Leu Ile Thr Thr Ala Leu Thr Glu Arg  
                                          100                                      105                                      110  
 Leu Thr Ser Leu Arg Arg Gly Arg Ser Thr Val Leu Glu Gln Gly His  
                                          115                                      120                                      125  
 Ala Val Val Leu Gly Trp Ser Glu Gln Val Phe Thr Val Val Ser Glu  
   130                                      135                                      140  
 Leu Val Ala Ala Asn Val Asn Gln Arg Gly Ala Ala Val Val Val Leu  
   145                                      150                                      155                                      160  
 Ala Asp Arg Asp Lys Thr Val Met Glu Glu Ser Leu Gly Thr Lys Val  
                                          165                                      170                                      175  
 Gly Ser Cys Gly Gly Thr Arg Leu Ile Cys Arg Ser Gly Pro Thr Thr  
                                          180                                      185                                      190  
 Asp Pro Ala Val Leu Pro Leu Thr Ser Pro Ala Thr Ala Gly Val Val  
                                          195                                      200                                      205  
 Leu Val Leu Pro Pro Asp Glu Pro His Ala Asp Ala Glu Val Val Lys  
   210                                      215                                      220  
 Thr Leu Leu Ala Leu Arg Ala Ala Leu Ala Gly Ala Lys Pro Arg Pro  
   225                                      230                                      235                                      240  
 Pro Val Val Ala Ala Val Arg Asp Asp Arg Tyr Arg Leu Ala Ala Cys  
                                          245                                      250                                      255  
 Leu Ala Ala Gly Pro Asp Gly Val Val Leu Glu Ser Asp Thr Val Thr

104



Arg Pro His Tyr Gly Val Arg Ile Asn Pro Pro Lys Arg Glu Arg Arg  
610 615 620

Arg Trp Thr Ala Glu Asp Glu Val Val Val Ile Gly Thr Asp  
625 630 635

<210> 36

<211> 165

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 36

Met Pro Ser Thr Asp Val Val Glu Leu Ile Leu Arg Asp His Arg Arg  
1 5 10 15

Met Glu Glu Leu Phe Arg Thr Leu Arg Asn Val Glu Ala Asp Arg Ala  
20 25 30

Ala Ala Leu Thr Glu Phe Ala Asp Leu Leu Ile Ala His Ala Ser Ala  
35 40 45

Glu Glu Asp Glu Val Tyr Pro Ala Leu Arg Arg Tyr Lys Asn Val Glu  
50 55 60

Gly Glu Asp Val Asp His Ser Val His Glu His His Glu Ala Asn Glu  
65 70 75 80

Ala Leu Leu Ala Leu Leu Glu Val Glu Asp Thr Ala Ser Asp Glu Trp  
85 90 95

Asp Asp Lys Leu Glu Glu Leu Val Thr Ala Val Asn His His Ala Asp  
100 105 110

Glu Glu Glu Arg Thr Leu Leu Asn Asp Ala Arg Glu Asn Val Ala Asp  
115 120 125

Asp Arg Arg Arg Glu Leu Gly Gln Lys Phe Gln Glu Ala Arg Ser Arg  
130 135 140

Tyr Leu Glu Thr Gly Cys Gly Ser Val Glu Asn Val Arg Lys Leu Val  
145 150 155 160

Ala Ala Ala Asp Asp  
165

<210> 37

<211> 787

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 37

Met Ala Arg Arg Leu Thr Glu Gly Arg Thr Arg Arg Glu Lys Gly Glu  
1 5 10 15

His Met Gln Lys Pro His Gly Glu Glu Ser Glu Thr Ser Leu Ser Val  
20 25 30

Thr Pro Pro Lys Lys Trp Ala Ala Gly Val Pro Ala Val Val His Ala  
35 40 45

Leu Glu Tyr Ser Leu Glu Gln Thr Ser Pro Arg Arg Thr Gly Val Asp  
50 55 60

Leu Leu Thr Met Asn Gln Val Gly Gly Ile Asp Cys Pro Gly Cys Ala  
 65 70 75 80  
 Trp Ala Asp Pro Ala Pro Gly Arg Arg His Arg Asn Glu Tyr Cys Glu  
 85 90 95  
 Asn Gly Ala Lys His Ile Asn Asp Glu Ala Thr Thr Arg Arg Val Thr  
 100 105 110  
 Ala Asp Phe Phe Arg Glu His Ser Val Ala Asp Leu Ala Gly Arg Ser  
 115 120 125  
 Asp Met Trp Leu Asn Gln Gln Gly Arg Leu Thr Glu Pro Met Ile Lys  
 130 135 140  
 Arg Pro Gly Ser Ala His Tyr Glu Pro Ile Gly Trp Asn Asp Ala Leu  
 145 150 155 160  
 Gly Val Leu Ala Glu Glu Leu Lys Ser Leu Ala Ser Pro Asp Glu Ala  
 165 170 175  
 Val Phe Tyr Thr Ser Gly Arg Ala Ser Asn Glu Ala Ala Phe Val Leu  
 180 185 190  
 Gln Leu Phe Ala Arg Ala Phe Gly Thr Asn Asn Leu Pro Asp Cys Ser  
 195 200 205  
 Asn Met Cys His Glu Ser Ser Gly Phe Ala Leu Ser Glu Thr Leu Gly  
 210 215 220  
 Thr Gly Lys Gly Thr Val Gly Leu Asp Asp Leu His His Ala Asp Leu  
 225 230 235 240  
 Ile Phe Leu Val Gly Gln Asn Pro Gly Ser Asn His Pro Arg Gln Leu  
 245 250 255  
 Ser Ala Leu Glu Glu Ala Lys Arg Asn Gly Ala Arg Ile Val Ala Val  
 260 265 270  
 Asn Pro Leu Pro Glu Ala Gly Leu Arg Arg Phe Lys Asn Pro Gln Gln  
 275 280 285  
 Pro Arg Gly Val Val Gly Arg Gly Thr Arg Ile Ala Asp Arg Phe Leu  
 290 295 300  
 His Ile Lys Pro Gly Gly Asp Leu Ala Leu Phe Gln Ala Leu Asn Arg  
 305 310 315 320  
 Leu Leu Leu Glu Ala Glu Asp Ala Arg Pro Gly Thr Val Leu Asp His  
 325 330 335  
 Asp Phe Ile Asp Ala His Thr Thr Gly Phe Glu Glu Phe Ala Arg His  
 340 345 350  
 Ala Arg Thr Val Asp Trp Asp Asp Val Arg Ala Ala Thr Gly Leu Thr  
 355 360 365  
 Arg Glu Glu Ile Glu Lys Val Arg Asp Glu Val Leu Asp Ser Glu Arg  
 370 375 380  
 Val Val Val Cys Trp Ala Met Gly Ile Thr Gln His Lys His Gly Val  
 385 390 395 400  
 Pro Thr Val Arg Glu Ile Val Asn Phe Leu Met Leu Arg Gly Asn Leu

	405		410		415
Gly Arg Ala Gly Thr Gly Ala Cys Pro Val Arg Gly His Ser Asn Val	420		425		430
Gln Gly Asp Arg Thr Met Gly Ile Trp Glu Gln Met Pro Asp Thr Phe	435		440		445
Leu Asp Ala Leu Arg Asp Glu Phe Gly Phe Glu Pro Pro Arg Ala His	450		455		460
Gly Leu Asp Ser Val Asn Ser Ile Lys Ala Met Arg Glu Gly Arg Val	465		470		475
Lys Val Phe Leu Ala Leu Ala Gly Asn Phe Val Arg Ala Ala Pro Asp	485		490		495
Ser Glu Val Thr Glu Glu Ala Met Arg Ser Cys Arg Leu Thr Ala His	500		505		510
Ile Ser Thr Lys Leu Asn Arg Ser His Thr Val Cys Gly Asp Thr Ala	515		520		525
Leu Ile Leu Pro Thr Leu Gly Arg Thr Glu Arg Asp Val Gln Ala Asp	530		535		540
Gly Glu Gln Phe Val Thr Val Glu Asn Ser Met Ser Glu Val His Thr	545		550		555
Ser Arg Gly Arg Leu Ala Pro Ala Ser Pro Met Leu Leu Ser Glu Ile	565		570		575
Ala Ile Leu Cys Arg Leu Ala Arg Leu Thr Leu Asp Gly Arg Val Glu	580		585		590
Ile Pro Trp Glu Thr Phe Glu Gly Asp Tyr His Thr Ile Arg Asp Arg	595		600		605
Ile Ala Arg Ile Val Pro Gly Phe His Asp Phe Asn Ala Arg Val Thr	610		615		620
Arg Pro Gly Gly Phe Gln Leu Pro Asn Pro Val Asn Glu Gly Val Phe	625		630		635
Asn Thr Glu Val Gly Lys Ala Leu Phe Thr Arg Asn Glu Ser Val Val	645		650		655
Pro Arg Ala Pro Glu Gly His Leu Leu Leu Gln Thr Leu Arg Ser His	660		665		670
Asp Gln Trp Asn Thr Val Pro Tyr Thr Asp Asn Asp Arg Tyr Arg Gly	675		680		685
Ile His Gly Ser Arg His Val Val Leu Val Asn Pro Ala Asp Leu Ser	690		695		700
Glu Leu Gly Leu Ala Gln Gly Asp Arg Val Asp Leu Val Ser Val Trp	705		710		715
Ala Asp Gly Thr Glu Arg Arg Ala Glu Asn Phe Gln Val Val Pro Tyr	725		730		735
Pro Ala Ala Lys Gly Ser Ala Ala Ala Tyr Tyr Pro Glu Thr Asn Val	740		745		750

Leu Val Pro Leu Asp Ser Val Ala Asp Ile Ser Asn Gln Pro Thr Ser  
 755 760 765

Lys Gly Ile Val Val Arg Leu Glu Pro Val Pro Asp Arg Thr Gln Pro  
 770 775 780

Ser Pro Ala  
 785

<210> 38

<211> 206

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 38

Met Ala Glu Gln His Glu Gly Pro Arg Ala Val Pro Asp Thr Pro Gly  
 1 5 10 15

Ala Arg Thr Ser Gly Asp Arg Ser Thr Gly Arg Arg Pro Leu Arg Glu  
 20 25 30

Arg His Val Asp Gln Thr Val Glu Val Ala Val Pro Val Arg Thr Ala  
 35 40 45

Tyr Asn Gln Trp Thr Gln Phe Lys Ser Phe Pro Arg Phe Ser Ala Val  
 50 55 60

Val Arg Asp Val Glu Gln Val Arg Pro Thr Val Thr Ala Trp Thr Leu  
 65 70 75 80

Gly Tyr Gly Pro Leu Arg Arg Arg Phe Ala Val Glu Ile Leu Glu Gln  
 85 90 95

Asp Pro Asp Ala Tyr Leu Ala Trp Arg Gly Leu Glu Gln Arg Pro Trp  
 100 105 110

His Arg Gly Glu Val Glu Phe Arg Pro Thr Glu Ser Gly Gly Thr Ala  
 115 120 125

Ile Thr Val Arg Val Leu Leu Glu Pro Arg Gly Ala Ala Arg Ile Leu  
 130 135 140

Thr Arg Ser Ser Arg Ala Val Arg Leu Thr Thr Arg Leu Val His Gly  
 145 150 155 160

Glu Leu Thr Arg Phe Lys Arg Phe Met Glu Gly Leu Gly Gln Glu Gly  
 165 170 175

Gly Ala Trp Arg Gly Thr Ile Arg Asn Gly Arg Val Gln His Asp Arg  
 180 185 190

Pro Glu Pro Pro Arg Ser Arg Val Ala Arg Trp Pro Val Gly  
 195 200 205

<210> 39

<211> 251

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 39

Met Leu Leu Leu Ile Ser Pro Asp Gly Val Glu Glu Ala Leu Asp Cys  
 1 5 10 15

Ala Lys Ala Ala Glu His Leu Asp Ile Val Asp Val Lys Lys Pro Asp  
 20 25 30

Glu Gly Ser Leu Gly Ala Asn Phe Pro Trp Val Ile Arg Glu Ile Arg  
 35 40 45

Asp Ala Val Pro Ala Asp Lys Pro Val Ser Ala Thr Val Gly Asp Val  
 50 55 60

Pro Tyr Lys Pro Gly Thr Val Ala Gln Ala Ala Leu Gly Ala Val Val  
 65 70 75 80

Ser Gly Ala Thr Tyr Ile Lys Val Gly Leu Tyr Gly Cys Thr Thr Pro  
 85 90 95

Glu Gln Gly Ile Ala Val Met Arg Ala Val Val Arg Ala Val Lys Asp  
 100 105 110

His Arg Pro Glu Ala Leu Val Val Ala Ser Gly Tyr Ala Asp Ala His  
 115 120 125

Arg Ile Gly Cys Val Asn Pro Leu Ala Leu Pro Asp Ile Ala Ala Arg  
 130 135 140

Ser Gly Ala Asp Ala Ala Met Leu Asp Thr Ala Val Lys Asp Gly Thr  
 145 150 155 160

Arg Leu Phe Asp His Val Pro Pro Asp Thr Cys Ala Glu Phe Val Arg  
 165 170 175

Arg Ala His Ala Ala Gly Leu Leu Ala Ala Leu Ala Gly Ser Val Arg  
 180 185 190

Gln Thr Asp Leu Gly Arg Leu Thr Arg Ile Gly Thr Asp Ile Val Gly  
 195 200 205

Val Arg Gly Ala Val Cys Glu Gly Gly Asp Arg Asn Ala Gly Arg Ile  
 210 215 220

Arg Pro His Leu Val Ala Ala Phe Arg Ser Glu Met Asp Arg His Ala  
 225 230 235 240

Arg Glu His Arg Ala Gly Val Thr Thr Ala Ser  
 245 250

&lt;210&gt; 40

&lt;211&gt; 467

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 40

Met Pro Thr Pro Ala Pro Asp His Ala Pro Ala Gln Arg Ala Ala Pro  
 1 5 10 15

Leu Ala Val Val Asp Pro Ala Thr Gly Thr Val Phe Asp Glu Ala Pro  
 20 25 30

Asp Gln Gly Pro Asp Val Leu Asp Ala Val Val Asp Arg Ala Arg Arg  
 35 40 45

Ala Trp His Gly Trp Arg Ala Asp Pro Asp Ala Arg Thr Thr Ala Leu  
 50 55 60

Arg Ser Ala Ala Asp Ala Val Glu Ala Ala Gly Asp Asp Leu Ala Arg

65	70	75	80
Leu Leu Thr Arg Glu Gln Gly Lys Pro Leu Ala Glu Ser His Ala Glu	85	90	95
Val Ala Arg Thr Ala Ala Arg Leu Arg Tyr Phe Ala Gly Leu Ala Pro	100	105	110
Arg Thr Arg Arg Ile Thr Asp Gly Arg Pro Val Arg Ser Glu Val Arg	115	120	125
Trp Arg Pro Leu Gly Pro Val Ala Ala Ile Val Pro Trp Asn Phe Pro	130	135	140
Leu Gln Leu Ala Ser Ala Lys Phe Ala Pro Ala Leu Ala Ala Gly Asn	145	150	155
Thr Met Val Leu Lys Pro Ser Pro Phe Thr Pro Leu Ala Thr Arg Leu	165	170	175
Leu Gly Ser Val Leu Ala Thr Ala Leu Pro Glu Asp Val Leu Thr Val	180	185	190
Val Thr Gly Arg Glu Pro Leu Gly Ala Arg Leu Ala Ala His Pro Gly	195	200	205
Ile Arg His Val Thr Phe Thr Gly Ser Val Pro Thr Gly Arg Ala Val	210	215	220
Ala Arg Ala Ala Ala Ala Ser Leu Ala Arg Val Thr Leu Glu Leu Gly	225	230	235
Gly Asn Asp Ala Ala Val Leu Leu Asp Asp Val Glu Val Asp Arg Ile	245	250	255
Ala Asp Arg Leu Phe Trp Ala Ala Phe Arg Asn Cys Gly Gln Val Cys	260	265	270
Met Ala Val Lys Arg Val Tyr Ala Pro Ala Arg Leu His Ala Gln Val	275	280	285
Val Glu Ala Leu Thr Glu Arg Ala Lys Ala Val Ala Val Gly Pro Gly	290	295	300
Leu Asp Pro Arg Thr Arg Leu Gly Pro Val Ala Asn Ala Pro Gln Leu	305	310	315
Ala Arg Val Glu Gln Ile Thr Arg Arg Ala Leu Ala Asp Gly Ala Arg	325	330	335
Ala Ala Ala Gly Gly His Arg Leu Asp Gly Pro Gly Cys Phe Phe Ala	340	345	350
Pro Thr Ile Leu Thr Asp Val Pro Pro Asp Ser Pro Val Val Thr Glu	355	360	365
Glu Gln Phe Gly Pro Val Leu Pro Val Leu Pro Tyr Arg Ser Leu Asp	370	375	380
Glu Ala Val Asp Ala Ala Asn Gly Thr Gly Phe Gly Leu Gly Gly Ser	385	390	395
Val Trp Gly Thr Asp Leu Asp Arg Ala Glu Ala Val Ala Asp Arg Leu	405	410	415

Glu Cys Gly Thr Ala Trp Val Asn His His Ala Glu Leu Ser Leu Ala  
 420 425 430

Gln Pro Phe Ala Gly Asp Lys Asp Ser Gly Val Gly Val Ala Gly Gly  
 435 440 445

Pro Trp Gly Leu Tyr Gly Asn Leu Arg Pro Phe Val Val His Arg Pro  
 450 455 460

Arg Gly Glu  
 465

<210> 41

<211> 368

<212> PRT

<213> Streptomyces parvulus Tü4055

<400> 41

Met Ser Phe Arg Ala Ala Val Leu Arg Gly Tyr Glu Asp Pro Phe Thr  
 1 5 10 15

Val Glu Glu Val Thr Leu Gly Thr Glu Pro Gly Ala Gly Glu Ile Leu  
 20 25 30

Val Glu Ile Ala Gly Cys Gly Met Cys Arg Thr Asp Leu Ala Val Arg  
 35 40 45

Arg Ser Ala Gly Arg Ser Pro Leu Pro Ala Val Leu Gly His Glu Gly  
 50 55 60

Ser Gly Val Val Val Arg Thr Gly Gly Gly Pro Asp Thr Ala Ile Gly  
 65 70 75 80

Val Gly Asp His Val Val Leu Ser Phe Asp Ser Cys Gly His Cys Arg  
 85 90 95

Asn Cys Arg Ala Ala Ala Pro Ala Tyr Cys Asp Ser Phe Ala Ser Leu  
 100 105 110

Asn Leu Phe Gly Gly Arg Ala Glu Asp Pro Pro Arg Leu Thr Asp Gly  
 115 120 125

Ser Gly Ala Ala Leu Ala Pro Arg Trp Phe Gly Gln Ser Ala Phe Ala  
 130 135 140

Glu Tyr Ala Leu Val Ser Ala Arg Asn Ala Val Arg Val Asp Pro Ala  
 145 150 155 160

Leu Pro Val Glu Leu Leu Gly Pro Leu Gly Cys Gly Phe Leu Thr Gly  
 165 170 175

Ala Gly Ala Val Leu Asn Thr Phe Ala Ala Gly Pro Gly Asp Thr Leu  
 180 185 190

Val Val Leu Gly Ala Gly Ala Val Gly Leu Ala Ala Val Met Ala Ala  
 195 200 205

Thr Ala Ala Gly Ala Pro Ser Val Ala Val Asp Arg Asn Pro Arg Arg  
 210 215 220

Leu Glu Leu Ala Glu Arg Phe Gly Ala Val Pro Leu Pro Ala Ala Thr  
 225 230 235 240

Ala Gly Leu Ala Glu Arg Ile Arg Arg Leu Thr Asp Gly Gly Ala Arg  
 245 250 255

Tyr Ala Leu Asp Thr Thr Ala Ser Val Pro Leu Ile Asn Glu Ala Leu  
 260 265 270

Arg Ala Leu Arg Pro Thr Gly Ala Leu Gly Leu Val Ala Arg Leu His  
 275 280 285

Thr Ala Leu Pro Leu Glu Pro Gly Thr Leu Asp Arg Gly Arg Ser Ile  
 290 295 300

Arg His Val Cys Glu Gly Asp Ala Val Pro Gly Leu Leu Ile Pro Gln  
 305 310 315 320

Leu Thr Arg Leu Trp Gln Ala Gly Arg Phe Pro Phe Asp Gln Leu Val  
 325 330 335

Arg Thr Tyr Pro Leu Ala Asp Ile Asn Glu Ala Glu Arg Asp Cys Asp  
 340 345 350

Ala Gly Leu Val Val Lys Pro Val Leu Leu Pro Pro Ala Arg Ser Arg  
 355 360 365

&lt;210&gt; 42

&lt;211&gt; 301

&lt;212&gt; PRT

&lt;213&gt; Streptomyces parvulus Tü4055

&lt;400&gt; 42

Met Thr Gly Thr Ala Pro Gln Tyr Thr Asp Val Glu Gly Val Asn Gly  
 1 5 10 15

Gly Val Gly Leu Thr Ala Phe Leu Val Ala Ala Ala Arg Ala Ile Glu  
 20 25 30

Thr His Arg Asp Asp Ser Leu Ala Gln Asp Val Tyr Ala Glu His Phe  
 35 40 45

Val Arg Ala Ala Pro Ala Cys Ala Asp Trp Pro Val Arg Ile Glu Gln  
 50 55 60

Val Pro Asp Gly Asp Gly Asn Pro Leu Trp Gly Arg Phe Ala Arg Tyr  
 65 70 75 80

Phe Gly Leu Arg Thr Arg Ala Leu Asp Asp Phe Leu Leu Arg Ser Val  
 85 90 95

Arg Thr Gly Pro Arg Gln Val Val Leu Leu Gly Ala Gly Leu Asp Thr  
 100 105 110

Arg Ala Phe Arg Leu Asp Trp Pro Ser Gln Cys Ala Val Phe Glu Ile  
 115 120 125

Asp Arg Thr Gly Val Leu Ala Phe Lys Gln Gln Val Leu Thr Asp Leu  
 130 135 140

Ala Ala Thr Pro Arg Val Glu Arg Val Pro Val Pro Val Asp Leu Arg  
 145 150 155 160

Ala Asp Trp Ala Gly Ala Leu Thr Ala Ala Gly Phe Asp Pro Ala Ala  
 165 170 175

Pro Ser Val Trp Leu Ala Glu Gly Leu Leu Phe Tyr Leu Pro Gly Pro



180 185 190  
 Ala Glu Ser Leu Leu Val Asp Thr Val Asp Arg Leu Thr Thr Asp Gly  
 195 200 205  
 Ser Ala Leu Ala Phe Glu Ala Lys Leu Glu Lys Asp Leu Leu Ala Tyr  
 210 215 220  
 Arg Asp Ser Ala Ile Tyr Thr Ala Thr Arg Glu Gln Ile Gly Ile Asp  
 225 230 235 240  
 Leu Leu Arg Leu Phe Asp Lys Gly Pro Arg Pro Asp Ser Ala Gly Glu  
 245 250 255  
 Leu Ala Ala Arg Gly Trp Ser Thr Ser Met His Thr Pro Phe Val Phe  
 260 265 270  
 Thr His Arg Tyr Gly Arg Gly Pro Leu Pro Glu Pro Asn Asp Ala Leu  
 275 280 285  
 Glu Gly Asn Arg Trp Val Phe Ala Arg Lys Pro Gly Pro  
 290 295 300  
 <210> 43  
 <211> 179  
 <212> PRT  
 <213> Streptomyces parvulus Tü4055  
 <400> 43  
 Met Cys Met Arg Asp Glu Ala Ala Lys Arg Val Glu Leu Val Phe Ser  
 1 5 10 15  
 Leu Phe Asp Ala Asn Gly Asn Gly Val Ile Asp Ser Asp Asp Phe Asp  
 20 25 30  
 Leu Met Thr Asp Arg Val Val Ala Ala Ala Gly Ser Asp Asp Ser  
 35 40 45  
 Ala Lys Ala Ala Val Arg Ala Ala Phe Arg Arg Tyr Trp Thr Thr Leu  
 50 55 60  
 Ala Thr Glu Leu Asp Ala Asp Gly Asp Gly Val Ile Thr Val Glu Glu  
 65 70 75 80  
 Phe Arg Pro Phe Val Leu Asp Pro Glu Arg Phe Gly Pro Thr Ile Ala  
 85 90 95  
 Glu Phe Ala Arg Ala Leu Ser Ala Leu Gly Asp Pro Asp Gly Asp Gly  
 100 105 110  
 Leu Ile Glu Arg Pro Leu Phe Val Ala Leu Met Lys Ala Ile Gly Phe  
 115 120 125  
 Glu Glu Ala Asn Ile His Ala Leu Phe Asp Ala Phe Ala Pro Asp Ala  
 130 135 140  
 Ala Asp Arg Ile Thr Val Ala Ala Trp Ala Ser Gly Ile Glu Asp Tyr  
 145 150 155 160  
 Tyr Ala Pro Asp Leu Ala Gly Ile Pro Gly Asp Arg Leu Val Ala Ala  
 165 170 175  
 Arg Thr Val

<210> 44  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM410  
  
 <400> 44  
 aaaatgcatt cggcctgaac ggccccgctg tca 33  
  
 <210> 45  
 <211> 33  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM411  
  
 <400> 45  
 aaatggccag cgaacaccaa caccacacca cca 33  
  
 <210> 46  
 <211> 32  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM412  
  
 <400> 46  
 aaagtcctag gcggcggccg gcgggtcgac ct 32  
  
 <210> 47  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM413  
  
 <400> 47  
 tttagatctc gcgacgtcgc acgcgccgaa cgtca 35  
  
 <210> 48  
 <211> 34  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM414  
  
 <400> 48  
 aaactgcaga gtcgaacatc ggtcacacgc agg 34  
  
 <210> 49  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence: oligo CM415  
  
 <400> 49

aaaatgcatg atccacatcg atacgacgcg cccga

35

<210> 50

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM416

<400> 50

taaatgcatt ccattcgggtg caggtggagt tgatcc

36

<210> 51

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM417

<400> 51

ataggatccc ctccgggtgc tccagaccgg ccaccc

36

<210> 52

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM368

<400> 52

tttctgcag gccatcccca cgatcgcgat cggct

35

<210> 53

<211> 35

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM369

<400> 53

tttcatatga caggcagtgc tgtttcggcc ccatt

35

<210> 54

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM370

<400> 54

tttcatatgg cggatgccgt acgtgccgcc ggcgct

36

<210> 55

<211> 32

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM371

<400> 55  
tttcatatgc cccaggcgat cgtccgcacc ac 32

<210> 56  
<211> 41  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM372

<400> 56  
tttcatatgg tctcggcccc ccacacaaga gccctccggg c 41

<210> 57  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1819A

<400> 57  
gtcatgcatg cggcgggctc 20

<210> 58  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1819B

<400> 58  
ggtctagaac ggccgaactt 20

<210> 59  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1819C

<400> 59  
gttctagaac ctcggtcggc 20

<210> 60  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1819D

<400> 60  
ctggatccca cgctgctgcg 20

<210> 61  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BLDA

<400> 61  
ggagacttac ggggggatgc 19

<210> 62  
<211> 19  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BLDB

<400> 62  
ctccagcagc gaccagaac 19

<210> 63  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B19A

<400> 63  
cccatgcac accgacatac 20

<210> 64  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B19B

<400> 64  
gcgatatccc gaagaacgcg 20

<210> 65  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1920A

<400> 65  
gccaaagcttc ctcgacgcgc 20

<210> 66  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B1920B

<400> 66  
cactagtgcc tcacccagtt 20

<210> 67  
<211> 20  
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B1920C

<400> 67

cactagtgcac ggccgaagcg

20

<210> 68

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B1920D

<400> 68

tcggatccgt cagaccgttc

20

<210> 69

<211> 36

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM384

<400> 69

aacctgcagg taccgccgtg ggggtgcggtc gcccca

36

<210> 70

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM385

<400> 70

cgccgcacgc gtcgaagcca acga

24

<210> 71

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM386

<400> 71

tgtgggctgg tcgttgctt cgac

24

<210> 72

<211> 34

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM387

<400> 72

ggtgcctgca gcgtgagttc ctcgacggat ccga

34

<210> 73

<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM388

<400> 73  
gaggaactca ccctgcaggc accgct 26

<210> 74  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM395

<400> 74  
cgaacgtcca gccctcgggc atgcgt 26

<210> 75  
<211> 28  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM396

<400> 75  
tggcacgcat gcccgagggc tggacgtt 28

<210> 76  
<211> 35  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM397

<400> 76  
tttctctgcag gccatgccga cgatcgcgac aggct 35

<210> 77  
<211> 36  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM398

<400> 77  
aaacatatgg tcctggcgct gcgcaacggg gaactg 36

<210> 78  
<211> 35  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo CM399

<400> 78

tttcctgcag gcgatgccga cgatggcgat gggct

35

<210> 79

<211> 43

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM400

<400> 79

aaacctgcag gttccccggc gacgtggact cgccggagtc gtt

43

<210> 80

<211> 41

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo CM401

<400> 80

ttttctagag cgacgtcgca ggccggcgatg gtcacgcccg t

41

<210> 81

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B25A

<400> 81

ttctgcagcc gcggccttcg

20

<210> 82

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B25B

<400> 82

agaattcgcc ggcgccgctg

20

<210> 83

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B7T1

<400> 83

ggctgcagac gcggctgaag

20

<210> 84

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B7T2



<400> 84  
ccgatccca gagccacgtc 20

<210> 85  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BP4501

<400> 85  
cgtatgcatg gcgccatgga 20

<210> 86  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BP4502

<400> 86  
agccaattgg tgcactccag 20

<210> 87  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BNHT1

<400> 87  
gtcatgcatc agcgcacccg 20

<210> 88  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BNHT2

<400> 88  
gtgcaattgc cctggtagtc 20

<210> 89  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BTRNAS1

<400> 89  
tgtctagact cgcgcaaca 20

<210> 90  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo BTRNAS2

<400> 90  
tgaattccga agggggtggt 20

<210> 91  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B5B

<400> 91  
aactagtccg cagtggaccg 20

<210> 92  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B5A

<400> 92  
tcgatatcct caccgcccg 20

<210> 93  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B6B

<400> 93  
aactagtgtg gcagacggtc 20

<210> 94  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B5A

<400> 94  
tcgatatcct caccgcccg 20

<210> 95  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: oligo B6T1

<400> 95  
cggatgcac accggcacgg 20

<210> 96  
<211> 20  
<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B6T2

<400> 96

tgggatccgc ggggcggtac

20

<210> 97

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BBB

<400> 97

aactagtgcg atcccgggga

20

<210> 98

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BBA

<400> 98

cgtcgatata ctccaggggc

20

<210> 99

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BBT1

<400> 99

tactgcagca cacccggtgc

20

<210> 100

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BBT2

<400> 100

tgggatccgc tgtgtcatat

20

<210> 101

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BCB

<400> 101

cactagtcct cgccgggcac

20

<210> 102

<211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BCA

<400> 102

gaggatcccg gtcagcggca

20

<210> 103

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BCT1

<400> 103

gcctgcagcg acctcgccgg

20

<210> 104

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo BCT2

<400> 104

cgggatcccg tggcgtggtc

20

<210> 105

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B23A

<400> 105

atctgcagcg gcatcggtgt

20

<210> 106

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B23B

<400> 106

agaattctcc actgcggtcg

20

<210> 107

<211> 20

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: oligo B9A

<400> 107

acctgcaggc cgggctcatc

20

<210> 108  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: oligo B9B

<400> 108  
 agaattcggg cgagccgcg 20

<210> 109  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: oligo B231

<400> 109  
 atcaagcttc gtgtccatgg 20

<210> 110  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: oligo B232

<400> 110  
 gtcattgcatc aggcgttcgg 20

<210> 111  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: oligo B251

<400> 111  
 cttctagatg aaccctcca 20

<210> 112  
 <211> 20  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: oligo B252

<400> 112  
 gggcaattgc gcggcagctt 20

<210> 113  
 <211> 90  
 <212> PRT  
 <213> Streptomyces parvulus TU4055

<400> 113  
 Met Leu Gly Phe Tyr Ala Leu Leu Leu Ala Pro Ala Glu Leu Asp Leu  
 1 5 10 15

Leu Phe Val Gln Asp Gly Thr Gln Gly Arg Gly Ile Gly Arg Leu Leu  
20 25 30

Val Asp His Met Lys Arg Arg Ala Arg Ala Ala Gly Leu Asp Arg Val  
35 40 45

Arg Val Val Ser His Pro Pro Ala Glu Gly Phe Tyr Arg Ala Val Gly  
50 55 60

Ala Leu Pro Thr Gly Thr Ala Arg Ala Asn Pro Pro Ala Val Ala Trp  
65 70 75 80

Asp Arg Pro Val Leu Glu Phe Leu Ile Pro  
85 90